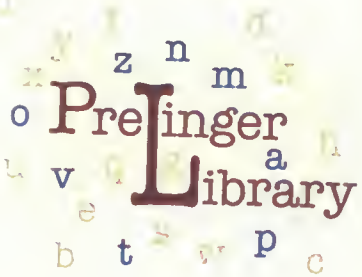
From the collection of the



San Francisco, California
2007

DISCARD

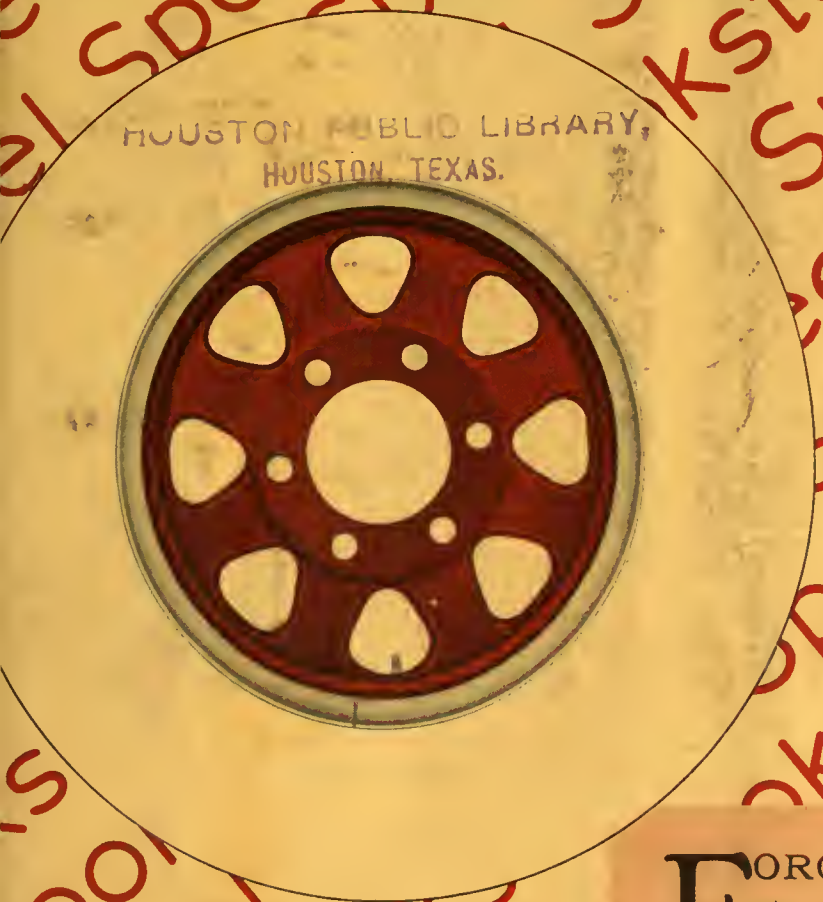
Digitized by the Internet Archive
in 2007 with funding from
Microsoft Corporation

http://www.archive.org/details/electricrailwayj70mcgrrich

ELECTRIC RAILWAY JOURNAL

raw-Hill Publishing Company, Inc. November 5, 1927 Twenty Cents per

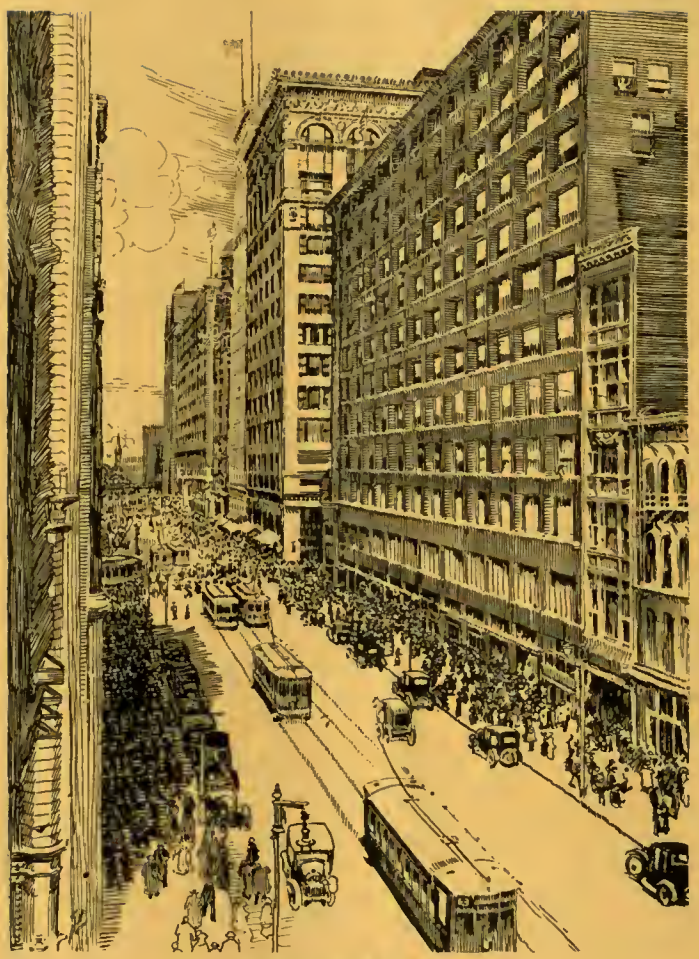
HOUSTON PUBLIC LIBRARY,
HOUSTON, TEXAS.



FORGED high carbon steel *IS* stronger. Spoked design *IS* more convenient, quieter and cleaner. Taking load off the studs *IS* most desirable. Simple, positive locking *IS* a great advance. Better cooling *IS* a tire-saver.

Spoksteel *IS* the wheel that bus operators have always hoped would come—another great development of the sort which make this the world's largest wheel business. There is no talking around the obvious superiorities of Spoksteel wheels. You should be running tests now.

MOTOR WHEEL CORPORATION, Lansing, Michigan



State Street looking toward the busiest corner in the world.

Transportation Builds the Busiest City in the World

CHICAGO is the greatest railroad center in the world—but that is only half the story.

She is also called the busiest city in the world and the efficiency of the local electric railway transportation is what makes this possible.

In this city of 3,000,000 people, the surface and elevated lines haul nearly six million passengers daily.

In the central business district these lines handle 61.6 per cent of the total local traffic, despite the large number of buses and passenger automobiles; this does not include local and suburban traffic handled by the steam and electric interurban railroads entering Chicago.

This superb achievement reflects the progressive policies of these systems in all departments—courtesy and fast schedules backed extensively by modern Westinghouse equipment, giving that superior type of service necessary to handle a traffic problem of such magnitude.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in All Principal Cities of the United States and Foreign Countries

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA 1927

Westinghouse W WESTINGHOUSE ELECTRIC

X95553

MORRIS BUCK
Managing Editor

JOHN A. DEWHURST
Associate Editor

JOHN A MILLER, JR.
Associate Editor

CLARENCE W SQUIER
Associate Editor

CARL W. STOCKS
Associate Editor

ELECTRIC RAILWAY JOURNAL

CHARLES GORDON, *Editor*

...acMURRAY

G. W. JAMES, JR.
Assistant Editor

PAUL WOOTON
Washington Correspondent

ALEX McCALLUM
Editorial Representative
London, England

Vol. 70
No. 19

Pages
849-888

CONTENTS

NOVEMBER 5, 1927

Editorials 849

Rehabilitation Brings Results on the South Shore Line 852
Within two years this property has been supplied with 1,500-volt equipment instead of alternating current, has been rehabilitated in many other ways and has almost doubled its gross revenue.

Interchange of Ideas Aids the Industry 857
By R. P. STEVENS.
The president of the American Electric Railway Association points out the trends in local transportation, as indicated in the briefs submitted in the 1927 Charles A. Coffin competition.

Coal Conserved by Chicago Surface Lines 859

Picturesque Loop at Miami, Oklahoma 859

Berlin Is Electrifying Its Stadtbahn 860
By HENRY W. BLAKE.
Direct-current third rail at 800 volts is being used. The entire system to be electrically equipped is equivalent to 316 miles.

Another Automatic Substation on the Pacific Electric 863

How the Birmingham Company Cares for Conventions 864

Insurance Problems of Motor Vehicle Common Carriers 865
By HENRY SWIFT IVES.
Mr. Ives discusses some of the difficulties encountered in connection with the underwriting of liability and other insurance for motor carriers.

Akron Lays New Track 866

Maintenance Data Sheets 867

New Equipment Available 871

Association Activities 872

Dorchester Extension Discussed by New England Club 872
Features of the new $12,000,000 rapid transit line are the topic of several papers at the Boston meeting, the first of the season. President Stevens of the A.E.R.A. and other speakers also addressed the meeting.

American Association News 873

News of the Industry 874

Recent Bus Developments 879

Financial and Corporate 882

Legal Notes 883

Personal Mention 884

Manufactures and the Markets 886

"An Apple a Day—"

DURING the past week millions of Americans have had called to mind the health couplet, "An apple a day keeps the doctor away." At first glance, this apple slogan appears rough on the doctor. Yet the wide-awake physician knows the value of such preventive medicine as an ally against the time when a serious health problem presents itself.

Next to physical torpor, mental stagnation is man's greatest enemy in all walks of life. It makes cowards of us all in industrial life. To prevent this deplorable ailment is the function of a business paper. By live constructive articles, it creates, so to speak, a mental apple a day in order to keep inertia away. Each week the JOURNAL strives to supply its readers with this "preventive medicine." For an inexhaustible supply it is dependent on every member of the industry. Let it then have your crop of apples to the end that our industry may be always healthy.

McGRAW-HILL PUBLISHING COMPANY, INC.
Tenth Avenue at 36th Street, New York, N. Y.
New York District Office, 285 Madison Ave.

JAMES H. McGRAW, President
JAMES H. McGRAW, JR., V.-P. and Treas.
MALCOLM MUIR, Vice-President
EDWARD J. MEHREN, Vice-President
MASON BRITTON, Vice-President
EDGAR KOBAK, Vice-President
C. H. THOMPSON, Secretary

WASHINGTON:
National Press Building
CHICAGO:
7 S. Dearborn Street
PHILADELPHIA:
1600 Arch St.
CLEVELAND:
Guardian Building
ST. LOUIS:
Bell Telephone Building
SAN FRANCISCO:
883 Mission Street
LONDON:
6 Bouverie Street, London, E. C. 4

Member Associated Business Papers, Inc.
Member Audit Bureau of Circulations

Cable Address: "Machinist, N. Y."

Publishers of
Engineering News-Record
American Machinist
Power
Chemical and Metallurgical Engineering
Coal Age
Coal Age News
Engineering and Mining Journal
Ingeniería Internacional
Bus Transportation
Electrical Railway Journal
Electrical World
Industrial Engineering
Electrical Merchandising
Radio Retailing
Construction Methods
Electrical West
(Published in San Francisco)
American Machinist—European Edition
(Published in London)

The annual subscription rate is $4 in the United States, Canada, Mexico, Alaska, Hawaii, Philippines, Porto Rico, Canal Zone, Honduras, Cuba, Nicaragua, Peru, Colombia, Bolivia, Dominican Republic, Panama, El Salvador, Argentina, Brazil, Spain, Uruguay, Costa Rica, Ecuador, Guatemala, Chile and Paraguay. Extra foreign postage to other countries $3 (total $7 or 29 shillings). Subscriptions may be sent to the New York office or to the London office. Single copies, postage prepaid to any part of the world, 20 cents.

Change of Address—When change of address is ordered the new and the old address must be given, notice to be received at least ten days before the change takes place.
Copyright, 1927, by McGraw-Hill Publishing Company, Inc.
Published weekly. Entered as second-class matter, June 23, 1908, at the Post Office at New York, N. Y., under the act of March 3, 1879. Printed in U. S. A.



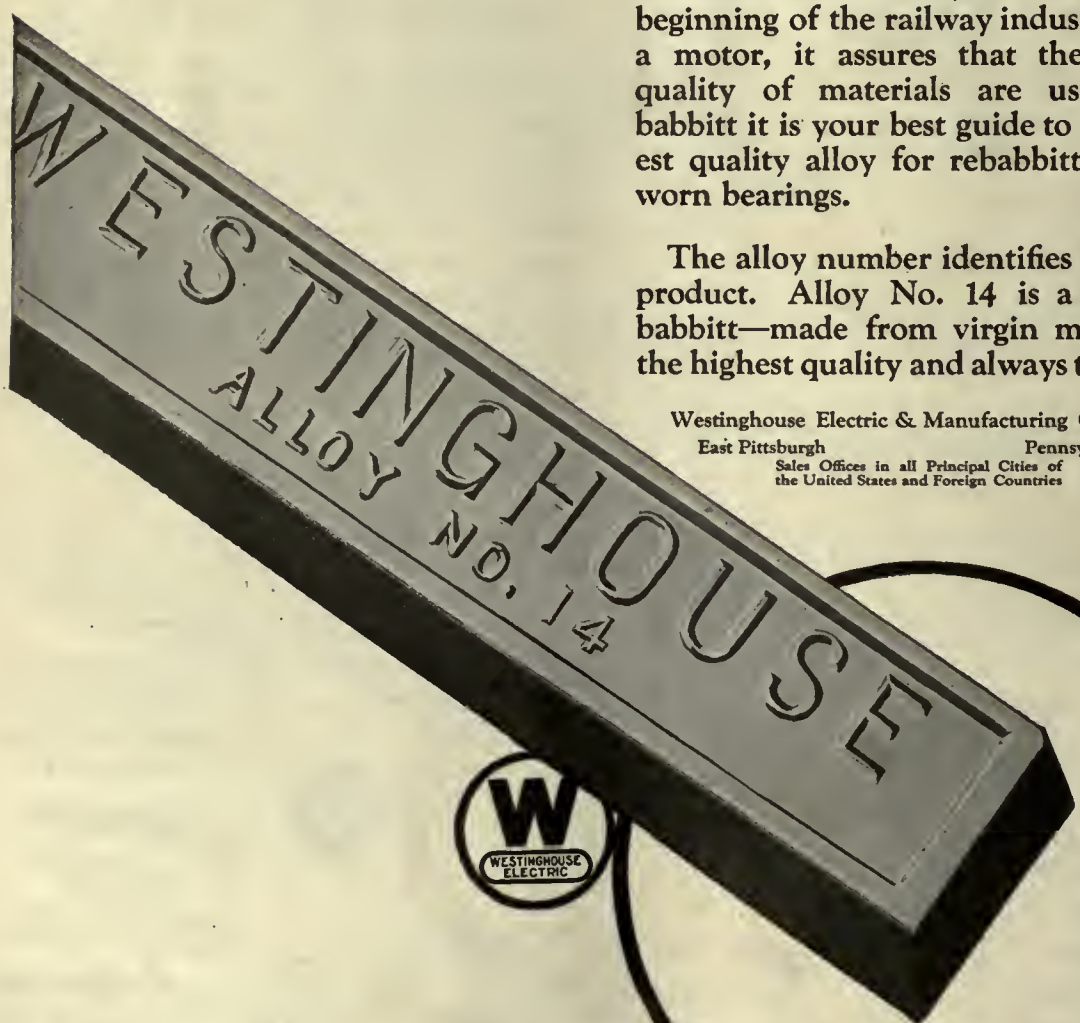
What Means the NAME

On the Babbitt YOU Use?

ON every bar of Westinghouse babbitt stands the name WESTINGHOUSE and the alloy number.

The name, Westinghouse, has been identified with railway motors since the beginning of the railway industry. On a motor, it assures that the highest quality of materials are used. On babbitt it is your best guide to the highest quality alloy for rebabbitting your worn bearings.

The alloy number identifies a specific product. Alloy No. 14 is a tin base babbitt—made from virgin metals—of the highest quality and always the same.



Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in all Principal Cities of the United States and Foreign Countries

MEMBER ELECTRIC RAILWAY EDUCATIONAL ASSOCIATION AERA 1927

Westinghouse

X95569



Greater visibility of both car and right-of-way is a proved method of selling more rides as well as lowering operating expenses. And remember that just one per cent saved in operating expenses adds nearly 20% to the net.

Do Your Headlights Measure Up?

DOES the illumination they give permit increased speed with safety? Does it prevent or minimize collisions and other accidents? *Does it play its part well in attracting more riders?*

These are some of the chief considerations that determine the value of headlights under present operating conditions. For speed has become one of the first and most important elements in service betterment. Faster service is even more important than better cars, according to the A. E. R. A. committee studying this subject.

And considering that in a few minutes many city and interurban cars pass from brightly lighted business districts to dim and dingy streets or outlying suburbs, correct illumination of the right-of-way, and of the car as it approaches, is essential to increased speed with safety.

On your next headlight order, specify O-B Imperials—if you want to assure yourself of all the advantages that only years of specialization in making headlights give. O-B Imperials are available for every operating condition, for every type of car. For complete particulars, just address

Ohio Brass Company, Mansfield, Ohio
Dominion Insulator & Mfg. Co., Limited
Niagara Fall, Canada
733C



ZP Special
A recess mounted headlight for city cars. Crystal or gold ray prismatic glass reflector gives maximum pick-up distance and a diffused beam that illuminates both sides of track. Adjustable socket takes lamps from 23 to 94 watt. Casing is pressed steel, weather and dust proof. Lock or spring catch optional.



Type WDF
A city and suburban service headlight for recess mounting. Furnished with crystal or gold ray glass or nickle plated copper reflectors. Can be used for dimming in congested districts and with bright lights for outlying districts where streets are poorly lighted. Lamp is adjustable for focusing. Casing is Armco Iron, alloy coated and black enameled. Lock or spring catch optional.



Type DCP
A portable headlight for high speed interurban cars. 500-watt lamp in mogul base, and 11-in. dia. crystal ray glass or nickle plated copper reflector, produce maximum in incandescent track illumination. Also furnished with medium screw base for lamps of 250 watts or less. Has two way focusing mechanism Uses Form C Resistance

Ohio Brass Co.

SALES OFFICES: NEW YORK CHICAGO PHILADELPHIA PITTSBURGH CLEVELAND SAN FRANCISCO LOS ANGELES

PORCELAIN INSULATORS
LINE MATERIALS
RAIL BONDS
CAR EQUIPMENT
MINING MATERIALS
VALVES

SAVING THE RAIL SAVES THE RAILWAY

333 amp. at 500 v.

209 amp. at 300 v.

150 lbs.



"AJAX"

ELECTRIC ARC WELDER

Do you realize that the Ajax is in a class by itself judged by combination of high capacity and low weight? Judged by any other standards, "Ajax" also maintains its lead. Its simple wiring scheme with all circuits in sight, the accessibility of all parts, the ample ventilation, the trolley pole making contact on the bright underside of the wire—these are some of the other features which make "Ajax" first choice on so many roads. Finally—price—lower than you'd expect if you didn't know.

Why not get a quotation?

Railway Track-work Co.

3132-48 East Thompson Street, Philadelphia

AGENTS:

Chester F. Gailor, 30 Church St., New York.
Chas. N. Wood Co., Boston.
Electric Engineering & Mfg. Co., Pittsburgh.
H. F. McDermott, 208 S. La Salle St., Chicago.
P. W. Wood Railway Supply Co., New Orleans, La.
Equipment & Engineering Co., London.
Frazar & Co., Japan.

1266

SAVING THE RAIL SAVES THE RAILWAY

Name .....

Company .....

Address .....

.....

.....

IF you are not familiar with the merits of Steel Twin Ties, if you are not now using Steel Twin Ties in your paved track construction, there is a lot of information in the Paved Track Notebook that will be very valuable to you. May we send you a copy? Just write your name in the coupon at the top, or pin your letterhead to it.



THE INTERNATIONAL STEEL TIE CO.
CLEVELAND, OHIO

Look it up in your "Paved Track Note Book"

Steel Twin Tie Track

Lighten—
The Unprofitable Load



You want to cut every pound of needless weight from every car, lighten the unprofitable load.

Davis "One-Wear" Steel Wheels can usually save several hundred pounds. They are made lighter because their material is stronger.

They will make old cars run better and new cars earn more.

You do not have to turn them.

AMERICAN STEEL FOUNDRIES

NEW YORK CHICAGO ST. LOUIS

Golden Glow



Safety!

Safety is the watchword of today's transportation needs. Accidents are dangerous, costly and a constant drain on resources. Safety pays dividends.

Good headlights provide this safety in night operation—while makeshift headlights or marker-lights are entirely inadequate in competition with the brilliant lighting of swiftly moving automobile traffic.

Let us tell you about Golden Glow Headlights—fully described in our latest pamphlets. Send for copies today.

Type DG Golden Glow Headlight for city service. Being fitted with a Golden Glow prismatic reflector it illuminates a wide area adjacent to and for about 50 feet ahead of the car.

Home office and plant at 17th & Cambria Sts., PHILADELPHIA; District Offices at 230 So. Clark St., CHICAGO; 50 Church St., NEW YORK; Bessemer Bldg., Pittsburgh; 88 Broad St., Boston; General Motors Bldg., Detroit; 316 N. Washington Ave., Scranton; Canadian Agents, Lyman Tube & Supply Company, Ltd., Montreal, Toronto, Vancouver.

ELECTRIC SERVICE SUPPLIES CO.

MANUFACTURER OF RAILWAY, POWER AND INDUSTRIAL ELECTRICAL MATERIAL



A modern "rail coach" of this year's prize-winning traction property at Grand Rapids, Michigan.

The Grand Rapids Railway Company, serving this city's 160,000 population, through its adoption of modern cars equipped with Safety Car Control Devices, has made phenomenal strides to reach its present peak of modern efficiency.

Another Coffin Prize is Won
. . . *by* another user of *Safety Cars*

MODERN CARS *for* MODERN SERVICE

RECOGNIZING the obvious advantages of Safety Car Control, the Grand Rapids Railway, this year's winner of the "Coffin Award," has adopted modern equipment embodying this modern control. Through its adoption, the city of Grand Rapids has enjoyed a truly efficient traction service, which has reflected to this property in the form of public good will, increased patronage, and a distinct economic gain.

That Safety Car advantages are not limited to Grand Rapids is proven by the fact that the "Coffin Award," for several consecutive years, has gone to users of modern cars . . . *Safety Cars.*

Safety Cars are modern cars . . . their presence invariably precedes an era of better service and its attendant economic advantages.



3120

SAFETY CAR DEVICES CO.
OF ST. LOUIS, MO.

Postal and Telegraphic Address:
WILMERDING, PA.

CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH

"We make The Safety Car Control Equipment . . . which makes the Safety Car."



and in Portland

OREGON

YELLOW ECONOMY









PREDOMINATES

Portland, Oregon—A growing city

RICH in natural timber. Rich in transportation facilities as offered by the Portland Electric Power Company through Yellow Coaches.

During 1926, the company's fleet of 24 motor coaches delivered 1,060,696 miles in city service at an operating cost of 21.82 cents per mile.

Yellow Type X 21-passenger city service and Type X 33-passenger city service coaches were used.

Six of the Yellow Type X coaches accomplished 291,360 miles at a cost of 19.53 cents per mile.

Seven Yellow Type *Z*-230 Coaches running inter-city between Portland and Oregon City over a 13-mile route accomplished 272,422 miles at a cost of 22.19 cents per mile.

Service in Portland handles a tremendous volume of traffic, more than half of which is transfer business. Seven city lines are operated on close headways and co-ordinate with street car service, forming a network of transportation in which Yellow Coaches play a prominent part.

Tremendous mileage at low operating cost proves that—

YELLOW ECONOMY PREDOMINATES.



1,060,696 MILES in City Service

at an operating cost of

21.82 Cents per Mile

COMBINED FLEET OF 24 COACHES	Cents per Mile
Superintendence Transportation	0.07
Drivers' Wages	7.10
Gasoline	3.50
Lubricants	0.33
Garage Labor Expense	1.58
Other Transportation Expense	0.38
Tires and Tubes	2.34
Mechanical Upkeep	2.00
General Office Expense	0.17
Insurance	0.32
Injuries and Damages	0.66
Rent of Equipment and Terminals	0.03
Other General Expense	0.02
Taxes and Depreciation	3.32
Total,	**21.82**

THAT'S what Yellow Coaches did in Portland—where Yellow economy predominates.

From coast to coast, in busy city traffic and along open country highways, Yellow Coaches are demonstrating the economy that lies in revenue earning, low-cost, profitable miles.

The combined experience of Yellow Coach *plus* General Motors makes this possible. Seasoned transportation experience and exceptional manufacturing facilities unite, with research, to offer motor coach units which stand every test.

Salesmanship may play a part in the initial purchase—but repeat orders are placed on the strength of performance and knowledge gained by experience. It is significant to note that Portland is constantly adding to its Yellow Coach fleet.

YELLOW TRUCK & COACH MANUFACTURING CO.
SUBSIDIARY GENERAL MOTORS CORPORATION
5801 WEST DICKENS AVENUE, CHICAGO, ILL.

KANSAS CITY



NP

WE HAVE "SHOWN THEM" IN MISSOURI

A YEAR AGO, in Kansas City, there was only *one* car equipped with NP Treadle Exit Doors. Today they are operating three hundred and eighty treadle cars and we have found that, even if you have to "show them", Missourians are keen observers and quick to take up anything that's good.

NATIONAL PNEUMATIC COMPANY

Executive office, Graybar Building, New York

General Works, Rahway, New Jersey

CHICAGO
518 McCormick Building

MANUFACTURED IN TORONTO, CANADA, BY
Railway & Power Engineering Corp., Ltd.

PHILADELPHIA
1010 Colonial Trust Building



A. C. F. Coach of modern design, gives a maximum seating capacity, ample space for covered baggage compartment, and positive safety through Air Brake control. The Westinghouse Automotive Air Brake is standard equipment on all A. C. F. models.

There is something *more* than *Safety* in the Westinghouse *Automotive* Air Brake



The Westinghouse Air Brake is standard equipment on many of the most prominent coaches . . . on many others it is optional equipment, approved and recommended by the manufacturer who is equipped to install the system upon specification.

Combatting the ever present evil of "brake riding," the Westinghouse Automotive Air Brake has come to be recognized not alone for its positive, safe, quick action—but as a potent economic necessity.

We feel safe in saying that more than half the expense of brake lining is wasted through nervous anticipation on the part of the driver, which is known as "brake riding"—the direct unconscious result of lack of confidence in ordinary brakes.

With the Westinghouse Automotive Air Brake, responsive to the slightest touch, unnecessary braking is minimized if not entirely eliminated, drivers are in turn relieved from undue mental and physical strain . . . and, as a consequence, an entire service is bettered.

Cut your braking expense . . . insure safety . . . get fuller information on the many advantages of the Westinghouse Automotive Air Brake from any of our conveniently located offices. This service is maintained for the exclusive use of the coach operator and is in no way obligatory.

6200

WESTINGHOUSE TRACTION BRAKE COMPANY
Automotive Brake Division: WILMERDING, PENNA.

WESTINGHOUSE
AUTOMOTIVE AIR BRAKES

Five Seconds Saved

—at a thousand dollars a second!



A woman ran out only a few feet in front of the car. The motorman switched to emergency and stopped within 6 inches of her,—*thanks to his magnetic brake.*

That is the substance of an accident report turned in only a short while ago on a large Southern property, which is using the Cincinnati Duplex Air and Magnetic Brake equipment. It is typical of the situations which lead to most accidents in city operation. Five seconds longer in stopping, and there might have been a costly claim to settle.

Yet, on this particular road, the maintenance on the magnetic brakes averages only about 65 cents a car per month,—little enough to pay for the kind of insurance that makes better service possible, as well as providing a practical and efficient safeguard.

Technical data and installation estimates on request.

Cincinnati Car Company, Cincinnati, Ohio

CINCINNATI

BALANCED LIGHTWEIGHT **CARS**

The Four Features of BALANCED DESIGN *are the Cardinal Points of Today's Demand*

Safeguard and Accelerate Traffic

Automatic Signals by providing proper spacing of cars or trains, reduce trip time and enable more cars to be operated with consequent safety.

Interlocking installations at terminals and at grade crossings eliminate unnecessary stops and assure route continuity by means of signal indications.

Highway crossing protective devices of the flashing light, automatic flagman, or audible type, or combination of same, are a dependable insurance which soon pays off the investment.

Power operated remotely controlled switches are being used economically to accelerate Electric Railway traffic.

These Systems are products of the

TRADE MARK **Union Switch & Signal Co.** TRADE MARK

SWISSVALE, PA.



The "LOUIS JOLIET"—

the Car that won universal admiration at Cleveland—





Built by

CUMMINGS CAR & COACH CO.

111 W. MONROE ST., CHICAGO

Making New Friends



In BURLINGTON *Operating records made for The Burlington Rapid Transit Company at Burlington, Vt., by three 4-cylinder Graham Brothers Motor Coaches were so satisfactory that the company ordered two 6-cylinder coaches immediately they were announced.*



In MEADVILLE *Three new 6-cylinder Graham Brothers Motor Coaches have gone into service for the Penn Public Motor Transportation Company at Meadville, Pa., alongside of the three 4-cylinder coaches that have already made an astonishing record for dependable, economical service.*

GRAHAM MOTOR

SOLD BY DODGE BROTHERS DEALERS EVERYWHERE

—Holding Old Ones

Greater Speed, More Smoothness, Added Safety and Increased Comfort Mark the 6-Cylinder Types of Graham Brothers Motor Coaches

With 6-cylinder engine, 4-speed transmission, 4-wheel brakes (Lockheed Hydraulic) and 3-stage progressive type springs Graham Brothers Motor Coaches are rapidly increasing their already widespread popularity.

The old essentials to profitable operation — medium capacity, low operating and maintenance costs, fine appearance and dependability—remain basic.

Service, when needed, is available from Dodge Brothers Dealers—always and everywhere.

Price is exceptionally low—due to great volume production.

Old users are enthusiastic over the Six line. New users are steadily increasing.

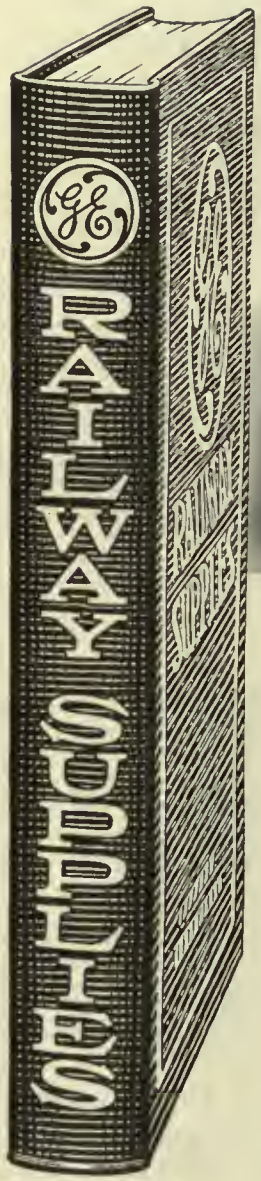
GRAHAM BROTHERS
EVANSVILLE — DETROIT — STOCKTON
A DIVISION OF DODGE BROTHERS, INC
GRAHAM BROTHERS (CANADA) LIMITED, TORONTO, ONTARIO

$4045
12-Passenger Parlor Coach (f. o. b. Detroit)

$4060
21-Passenger Street Car Type (f. o. b. Detroit)

$4290
16-Passenger Parlor Coach (f. o. b. Detroit)

BROTHERS COACHES





Used in G-E equipment hence recommended for equipment maintenance

The highly satisfactory results that have followed the use of G-E No. 880 insulating compound prompt its unqualified recommendation for maintenance work. G-E No. 880 will not blister or burn easily. It gives a hard, smooth finish which shows the presence of carbon dust immediately. It can be scraped and cleaned without injury. Since it is oil and arc resistant, its use is particularly adapted to commutator end-rings, brush-yokes, frames, and control parts subject to the possibility of flashing.

Other G-E insulating compounds and materials are listed in the G-E Railway Supplies Catalog. Use your catalog to simplify your buying.

General Electric is continuously developing new methods, new materials, and new designs for the improvement of its products. The results of this research, as applied to the maintenance of electric railway equipment, are available to the railway industry.

330-55

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN PRINCIPAL CITIES

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review
Published by McGraw-Hill Publishing Company, Inc.
CHARLES GORDON, *Editor*

Volume 70 New York, Saturday, November 5, 1927 *Number 19*

Putting Accident Responsibility Where It Belongs

MOST accidents are due to carelessness. This is particularly true of grade crossing accidents. Too many people have taken the position that it is the railway's duty to protect the crossing, and not their own duty to be careful. This attitude of negligence has now been rudely upset by a decision of the United States Supreme Court putting the responsibility for his own safety squarely on the shoulders of the driver of the vehicle.

"When a man goes upon a railroad track," the decision says, "he knows that he goes to a place where he will be killed if a train comes upon him before he is clear of the track. He knows that he must stop for the train, not the train for him. In such circumstances, it seems to us that if a driver cannot be sure otherwise whether a train is dangerously near, he must stop and get out of his vehicle, although obviously he will not often be required to do more than to stop and look. It seems to us that if he relies upon not hearing the train or any signal and takes no further precaution, he does so at his own risk."

Thus the Supreme Court set aside a judgment against the Baltimore & Ohio Railroad allowed by a lower court in favor of the estate of a man who was killed in a grade crossing accident. The logic applies with equal force to grade crossings of electric railways. While the full import of the decision cannot be known until the entire text is available, it would seem to put greater responsibility upon the automobile owner at grade crossings than in the past. This is a step in the right direction.

Needless to say, the railways will continue to take every reasonable precaution to prevent accidents. Putting the responsibility on the driver after the accident has happened does not save the railway from loss. It will, however, save the added burden of a large indemnity for injury or damage for which the railway was not to blame.

The High Cost of Automobiling

FOR the first time authentic figures have been obtained that show how the average dollar is spent for retail products in an American city. The United States Census Bureau, with the co-operation of the Chamber of Commerce of the United States and the local chambers of commerce, has recently completed a retail census of distribution in eight American cities. The first to be released is that in Syracuse, N. Y. From a transportation standpoint the most remarkable finding is that out of the retail purchase dollar nearly 17 cents goes to automobiling, auto sales absorbing about 10¼ cents, gasoline 3½ cents and accessories 3 cents. Since the total retail sales in the city amount to $103,000,000, the cost of automobiles is some $17,250,000 a year.

Contrast this 17 cents for automobiling with 27 cents out of the retail dollar spent for food, 22 cents for clothing and 7 cents for housefurnishings—things usually looked on as necessities—and it looms even larger. However, it is only when a comparison is made with the amount paid for public transportation that its real significance is seen. Residents of Syracuse spent some $2,355,000 for trolley and bus fares in 1926. Thus the amount spent on automobiles in that city last year was 7.3 times as great as all the money spent for public transportation!

It may be argued that a considerable part of the automobile total was spent for capital account, being for purchases of cars. However, it is an expenditure that is going on year after year, and now has become to a large extent a replacement charge. It also may be said, on the other hand, that the trolley and bus fares include a certain amount for depreciation and replacement of the plant.

There is a silver lining in the cloud, in that the number of passengers carried by the public transportation system in Syracuse increased last year despite this staggering expenditure for a competitor. This indicates that the public has an appreciation of the value of the railway company's service and is making use of it. Furthermore, it is an indication that when the public carrier supplies the kind of service demanded by the public its demise is a long way off, at least in this typical American city.

If the Public Could Be Made to Understand

FUNDAMENTAL principles of business are so unerringly laid down in the decision of the Massachusetts regulatory body in the Holyoke fare case that it is too bad the findings in full will go largely unread even by the very people who patronize the Holyoke system. It is a typical case, typical in that the city, one of 60,000 people, is of the size in which the railways have been hardest hit, typical in that the management has been progressive and alert and typical in that, despite all that has been done, 3,000,000 fewer riders were carried in 1926 than in 1920.

There have been cases of exploitation in the electric railway field, but no stigma attaches to the conduct of the Holyoke property. The company put off its appeal to the state until the last minute. It sought only what was just and reasonable and the commission insists that it shall be allowed what is just and reasonable. That the commission deemed it expedient to modify slightly the tariff filed by the company does not change the fundamentals involved. Massachusetts utility companies, judiciously regulated by the state from their very inception, are obliged to sell their stock at par or at a premium, if they are to sell it at all.

In the past many of the companies serving the public, the electric railways included, have sold stock at a handsome premium. Among them was the Holyoke company,

now seeking to preserve itself in the face of changed economic and industrial conditions. It is true the company paid dividends in 1926, but it actually earned only 4.17 per cent on its stock and premium.

The nub of the situation seems to lie in the fact that had there been no falling off in the number of passengers carried in 1927 as contrasted with 1920 the company would have received additional revenue under the existing fare equivalent to the proposed increase. The rates authorized will, it is thought, preserve the *status quo*. The commission, in its decision, reiterated that any policy which results in failure to maintain the value of the stock of the company at par cripples its ability to meet the needs of the community, impairs its credit and, if long continued, results in financial disaster to the company and great inconvenience to the public.

There is nothing new in this as a commission attitude. Neither is there anything new in the statement of the commission that adequate service cannot be given unless the passengers pay rates sufficient to provide adequate service. They are merely axioms oft overlooked. It is the constant reiteration of these things that helps, particularly their reiteration in the clear, forceful way of the Massachusetts commission in passing upon the issues involved in the Holyoke application.

Getting More Recruits for the Industry's Work

NEED for a continuing supply of skilled labor to carry on the work of American industry has been felt ever since there has been the tremendous increase in output demanded by the present markets. Concern on this score is reflected in a bulletin recently issued by the Department of Manufactures of the Chamber of Commerce of the United States. It cites specifically a recent banquet given to more than 500 veterans in one concern with service records of 25 to 50 years. "How are they, with their skill and experience, to be replaced?" is the pertinent question asked.

Unfortunately, trained immigrants or the draft of skilled labor from neighboring plants is out of the question. Those who still contend that skilled labor can be hired when needed would only rob Peter to pay Paul. This policy can have but one outcome—lack of supply as the demand for labor increases more and more and the present skilled workers retire or die off. Someone must do the training. The answer is to induct into trades and shops American boys and make them see the industrial opportunities, meanwhile turning their eyes from the white collar jobs. That this can be done successfully is proved by results in a number of companies where attractive training has been developed.

Experience in the electric railway industry, no less than in others, indicates that there is opportunity for the trained worker, no matter in what line he is employed. Many prominent executives have passed through the school and have found it a direct route to executive positions.

Nothing should be done, however, to prevent the entry into the industry of the young man who has had the opportunity for the more intensive training offered by the colleges and technical schools. If such men can be induced to enter the ranks of skilled labor they can have an influence on methods far beyond anything yet accomplished. They are the men who, if ready to seek the romance and reward found in the industrial fabric of the country, may find their way to the front easier than had they held back for the positions that from the outset carry more authority and less bodily labor.

There is another field in which the services of such young men can be of great value as they become proficient workmen. This is in the training of other young men who have not been so fortunate in their educational advantages. This training can then be made more intensive and more interesting than when outsiders plan and administer it. Those who are able to do the teaching will have a reward not only in the chance for their own more rapid advancement but in the better understanding of their work which will come naturally as a result of their labors in transmitting it to others.

The Menace of Government Operation and Federal Regulation

NO QUESTION to come before Congress at the impending session is likely to be of greater significance to the public utility industry than that of electric power. The issue may not take just this form, but it gives prospects of resolving itself into the answer to the interrogations: Shall the federal government decide to allow the unrestricted development of superpower organizations, or will Congress further tighten the present restrictions? Shall the government decide to go into the business of producing and selling electricity?

Proponents of government operation and federal regulation are prepared to seize upon the growth and magnitude of interconnection and the growth and prosperity of operating and holding companies to increase the inherent human fear of things that are big. That, however, is not all. Political adventurers may be counted on to distort the situation to their purposes by broad claims based on the citation of isolated instances which as a matter of fact are in nowise either typical or symptomatic. Facts will be sought by them in isolated situations where either exceptionally efficient municipal operations or exceptionally inefficient private operations provide the arguments they want.

It is, of course, true that the utilities are not entirely free from acts of remission. In the interest of truth, however, it has become highly important to the utility industry that a clear contrast be drawn in the public mind between these few apparent black spots and the record of honest, intelligent and efficient public service that has characterized the development of the great power systems of the country. To protect the public and defend the principles that underlie this splended development, accomplished only under the operation of highly specialized private management, the true picture must be made plain, based not on ingeniously selected isolated cases, but on the broad resources of facts that are typical and true of the industry as a whole.

As *Electrical World* pointed out in its issue of Oct. 29, no matter what one may think Congress is or is not going to do, the issue is important. If not, then George B. Cortelyou would not now be heading the recently reorganized joint committee of National Utility Associations and be at work preparing to conduct a campaign of public information intended to spread much light and expected to do much good. This effort is foredoomed to only a fragment of the achievement that might be possible unless the million and more men and women of the electrical industry are alive to the situation and daily exercise their personal influence in behalf of the industry of which they are a part. Theirs is the obligation to see that the shadow is not mistaken for the form.

Railways Develop a Soul

WITH the passing of the years there has been a great change in the attitude of the railway toward its public and, what is of equal moment, with its employees. True, the cartoonists still like to draw pictures of the bloated traction magnates with well-filled paunches covered with clothes bearing the old familiar dollar mark patterns. Some labor leaders still like to portray the two-fisted, hard-boiled boss and the downtrodden workingman. But with all this the public and the employee are seeing the manager in an entirely different rôle from that of yesterday. As an illustration of the change in attitude, who in the old days could imagine a thousand employees gathering together to rejoice over the successful culmination of a customer-ownership stock-selling campaign which they had conducted, and then remain to congratulate the president of the company on his birthday anniversary? Or who could conceive of the many 20-year or 25-year clubs that hold meetings where the veterans of the service rub elbows with the management and talk of the past and the future?

Other evidences of the trend of the times are the men-and-management control of several leading properties. Here the employees and the officials, working in a common cause, meet and discuss the problems of the company, formulating plans to foster mutual understanding and to promote the welfare of the men and the profits of the stockholders. It is also significant that in such companies many if not all of the employees are enrolled in the latter classification.

If the management is not willing to adopt a human attitude because it is the right thing to do, still it may find a reason in that it brings the right kind of financial results. Almost without exception those companies which are the most prosperous are the ones where the employees and the public have been taken into the confidence of the management. When they have been in trouble all parties have got together and found a way out that has given the public an improved service and made the employer a better one for which to work. Surely this is a result well worth the effort.

Insurance Regulations for Motor Vehicles Need to Be Unified

ONE of the outstanding difficulties to be overcome in stabilizing liability insurance of motor vehicle common carriers is the simplification, clarification and uniformity of insurance regulations, according to Henry Swift Ives, whose address on insurance problems, delivered at the recent Utilities Commissioners convention at Dallas, is abstracted in this issue. He rightly calls the present situation "a mess."

Many laws have been enacted by state legislatures and many rulings made by state utilities commissions. Most of these depart from standard insurance practices and even from other legislation governing the insurance business, according to Mr. Ives. Legislative or commission requirements conflicting with standard practices include: (1) Duplicate coverage of bus operators with both the liability policy and the workmen's compensation act, effective in most states; (2) necessity in some states for separate policies for bus passengers and others for which the operator may be liable; (3) allowing damage suits to be brought against insurance companies direct, making insurance rates higher since claimants sue for larger amounts; (4) ambiguous statutes and commission rulings prescribing the limits for which policies must be written; (5) lack of bus insurance laws prescribing the wording of policies or indorsements, and (6) requiring that the insurance policy cover not only the vehicles specifically enumerated but "any other" vehicles employed in the service. Other similar laws and rulings which serve no particular public interest add materially to the cost of insurance.

Little or no consideration has been given by any state to other states in adopting regulations. The lack of uniformity is vexatious to insurance companies and costly to bus operators, especially those doing an interstate business whose operating status has not yet been definitely settled. Obviously the remedy for the whole situation lies in the co-operation of all parties interested—the stock insurance companies, the utilities commissioners and the bus and truck operators—in order to secure the legislation and commission rulings necessary to obtain uniformity.

Encouraging Statistics on Safety Zones and Traffic Lights

OUT of a recent meeting of the administrative board of the American Engineering Council held at York, Pa., come interesting and encouraging signs in the matter of street car safety zones in city streets. Also accident reductions are shown as a result of the installation of electric signal traffic control in many cities.

It is revealed that street car safety zones are desirable on wide streets, according to returns from 81 cities reporting on the subject. Also, that these zones marked on the pavement but without other protection are considered worth while in only 24 of the cities, and that 58 cities indicated that the zones are desirable only if protected by pedestals and lights. Safety islands at cross walks are deemed effective in 48 of the cities for use in wide streets unguarded by signal lights.

Investigation of the feasibility and protective features of the electric signal traffic control reveal 71 cities reporting, of which 54 have reduced the number of accidents. Altoona, Fort Worth and Oklahoma City show a reduction of 100 per cent. Several cities report reductions ranging from 40 to 80 per cent. In 62 cities vehicle collisions have been diminished. In the month prior to the installation of the signals in Altoona there were 37 accidents. There have been none in the four succeeding months. In connection with these figures it should be remembered, however, that the installation of synchronized lights usually slows down traffic movement. Many automobile drivers then use streets not so controlled and the reduction of accidents in one locality is balanced by an increase elsewhere. Experience shows that regulation is effective only when it is properly designed to meet the needs of the situation.

The industry may well take pride in these results, as it has in no small way contributed to elimination of accidents by the installation of street safety zones and the participation of its engineers in matters pertaining to effective electric signal traffic control. The electric railways have not neglected this phase of public relations. With traffic congestion increasing hourly the problem of protecting pedestrians from injury and the owners of vehicles from property loss and of securing expeditious movement of traffic must be shared with the civic authorities.



Passengers boarding a limited train for Chicago

Rehabilitation Brings Results

on the South Shore Line

Within two years this property has been supplied with 1,500-volt equipment instead of alternating current, has been rehabilitated in many other ways and has almost doubled its gross revenue

IN THESE days when private automobile competition is keen, it is a satisfaction to record the experiences of those interurban electric railways which have developed good business in spite of it. Several striking examples of this kind have been given in these pages. Another is the Chicago, South Shore & South Bend Railroad, which in a little less than two years has almost doubled its gross revenue. In the first six months of 1927 the gross revenue was more than 100 per cent greater than for the corresponding period of 1926.

The following figures tell at a glance the progress that has been made in two years:

Year	Passenger Revenue	Freight Revenue
1925	$599,236	$189,236
1926	750,539	249,138
Twelve months ended July 15, 1927	1,217,116	330,489

Details of the steps through which this remarkable result was accomplished are given in the company's brief for the 1927 Coffin Prize. References also have been made naturally to this notable change in current issues of the ELECTRIC RAILWAY JOURNAL, but particularly on pages 218-220 of the issue for Aug. 6, 1927. The facts herewith are taken from the brief mentioned, so to a slight extent cover material printed more briefly in the Aug. 6 issue. The facts are given, however, from a different viewpoint.

A little more than two years ago the physical property and equipment were in a badly rundown condition. The company's operating revenues, passenger and freight, had shown a steady decrease year by year. It was not in a position to give the public the character of service necessary to meet competition, particularly from the private automobile. The present management acquired the property in July, 1925, and immediately undertook an extensive rehabilitation program. Speed and comfort in travel were considered essential if old business was to be held and new business procured. Neither of these essential requirements was possible under the conditions which prevailed at the time the property was acquired. The new management had faith in the future of the territory served by the railroad. Investors had faith in the new management.

The South Shore Line is a subsidiary of the Midland



South Shore Line steel passenger car, with baggage compartment, showing vestibule diaphragm and other details. In the background is one of the old-type passenger cars



A four-car South Shore Line passenger train on the "Ideal Section." This stretch of track has the latest type steel bridges for supporting the overhead catenary construction



Interior view of South Shore Line passenger car, showing roomy seating arrangement and wide aisle

Utilities Company, a holding company having investment in a number of public utilities in the territory. The Midland loaned its credit to the South Shore Line, enabling it to borrow new capital to rebuild and change over from a.c. to 1,500 d.c. and obtain new, up-to-date steel equipment. Without this credit the railroad could not have been rehabilitated and made a useful servant of the public.

New equipment equal to the best for electric railway service was ordered to assure the comfort of the traveling public. The roadbed was rebuilt to permit of high speed with safety, new stations were built and old ones remodeled. Schedules were speeded up, the public was kept fully informed of the improvements being made through extensive publicity and advertising and traffic solicitation was actively pushed. Results are shown in the revenue figures quoted on page 852.

The results achieved by the South Shore Line have been accomplished in the face of the keenest competition. No fewer than nine class "A" steam railroads operate in the territory, competing with the interurban for passenger business in one or more of the cities served, while an even greater number of belt and industrial railroads compete for freight.

In addition to steam railroad competition for a great part of its length the South Shore Line is paralleled by one of the finest paved highways in the country, providing ideal facilities for motor coaches and private automobiles. This highway is the main entrance into Chicago from Eastern states and it runs through the famed vacation resorts in northern Indiana and southern and western Michigan. A number of motor coach routes operate over this highway in direct competition with the railroad, so that it is only by giving the public a much faster and an equally comfortable service that the railroad has been able to build up the passenger business it now holds.

Realizing the importance of the motor coach in the transportation field and its popularity with a large portion of the public, the management of the South Shore Line on assuming control took steps in connection with its rehabilitation program to establish extensive motor coach service and so far as possible make it an auxiliary to the railroad.

With that end in view a separate corporation known as the Shore Line Motor Coach Company was organized. The motor coach company is owned jointly by the South Shore and the Gary Railways, a street railway serving the city of Gary, Ind., and connecting it with a number of cities in the territory. Like the South Shore Line, it is a subsidiary of the Midland Utilities Company.

This joint ownership of the motor coach line by the electric railways made possible a co-ordination of its service with both companies, greatly to the advantage of the traveling public through the issuance of tickets good on either rail or motor coach lines and the arranging of schedules to provide easy transfer facilities.

Buses Assist in Business Building

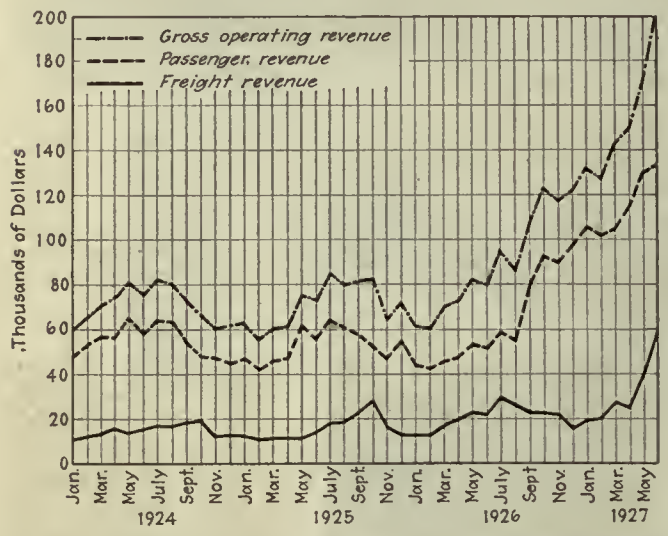
The main reason for organizing the motor coach company as a separate and distinct corporation was the belief that men charged with responsibility for its operation would take greater interest in developing its business than would be the case if the same officials operated both motor coach and railroad lines.

The motor coach lines have assisted the railroad materially in building up its passenger business because of the co-ordinated service. The motor coaches cover a wide stretch of territory far removed from the rail lines. Passengers traveling from Chicago to Michigan vacation resorts save time and avoid congestion by taking the rail

line to Michigan City, Ind., and there transferring to a motor coach.

Coach tickets are sold with an optional privilege of riding either on the South Shore Line trains between Michigan City and Chicago or on the coaches. The attention of passengers is called to the fact that an hour or more can be saved by them if they ride on the train.

If any prefer the motor coach all the way, regardless of the longer time required to travel through the Chicago congested area, it is there for their convenience and choice. The transfer business between motor coach and



Gross Operating Revenue, Passenger Revenue and Freight Revenue Since 1924

It is interesting to note the marked climb in gross operating revenue following the inauguration of new hourly service and the installation of the new passenger equipment late in August, 1926, as well as the continual increase in the following months. Up to the early part of this year this rise was due almost entirely to increased passenger earnings. Within the last few months the freight revenue has experienced a heavy increase, although it has had a steady climb since the railroad came under the present management.

railroad in both directions at Michigan City is steadily increasing, indicating that the public prefers the faster rail line in the congested area.

Direct Entrance to Downtown Chicago

Another factor which has contributed largely to the increase in passenger revenue of the South Shore Line is its direct entrance into the heart of Chicago under electric power. This was made possible by the recent electrification of the suburban tracks of the Illinois Central Railroad and the working out of an agreement with that company.

Under the conditions which formerly prevailed, trains of the South Shore Line entering and leaving Chicago were pulled by a steam locomotive between downtown and Kensington, in the southern section of the city, a distance of 16 miles. Changing from electric to steam power necessitated delays and the speed of the steam locomotive was much slower than that of the electric motor.

This change from steam to electric power within the city of Chicago resulted in eliminating the delays at Kensington and running schedules were reduced by twelve minutes for the 16 miles. The reduction in time alone greatly increased the popularity of South Shore Line service.

Having increased the speed of its trains and provided comfort by means of new and greatly improved equipment, one thing remained to complete the popularity of South Shore Line service. That was to increase the convenience to the public by more frequent service. As soon as it was in a position to do so the management put through trains between Chicago and South Bend, Ind. (a distance of 90 miles), on an hourly schedule instead of every two hours and installed a half-hourly service between downtown Chicago and Gary, Ind. (a distance of 31 miles).

The number of trains operating in and out of downtown Chicago was increased from 25 to 72 daily. The long-distance rider was separated from the short-distance commuter. Each class was given a distinct service for itself, so frequent and convenient that the traveler had no reason to seek other means of transportation. That the public appreciated the efforts to please is shown by the greatly increased business.

In developing its passenger business by every means at its command the company did not overlook the possibilities of freight development. Track connections were made with nine steam railroads and an interchange of freight cars effected. Through rates were established with steam railroads between the East and Chicago and to points west, the South Shore Line serving as an intermediate carrier.

Interchange Saves Shippers' Time

By use of this interchange system shippers found that at least 24 hours in the time of delivery could be saved. Freight cars on the electric railroad could be run at a much higher rate of speed and the congestion in the steam railroad classification yards avoided.

For less than carload freight the company installed an overnight service which proved popular with shippers. Receiving stations were established in the heavy shipping districts of Chicago. Freight delivered at any of these stations in the afternoon is hauled by trucks and trailers to the railroad and delivered to any point on the line ready for the consignee to pick up the following morning. Further particulars of this freight service will be given later.

Operates in Diversified Region

In considering the various factors which have contributed toward the marked success with which the South Shore Line has met in the last year the territory served should not be overlooked.

The railroad operates between Chicago and South Bend, Ind., a distance of 90 miles in a south and east direction. It serves the great industrial center in the Calumet River region, known as the "Workshop of America," with its immense steel mills in East Chicago and Gary, its great cement plants and other factories which give employment to tens of thousands of workers.

Emerging from this beehive of industry the railroad skirts the shore of Lake Michigan from Gary to Michigan City, passing through the famous Indiana Dunes, a region that is unique. It is a natural playground possessing the distinctive features which have made this region a mecca for outdoor enthusiasts. From April to October there is an endless succession of wild flowers.

On-Time Service

It was recognized that in the past trains not on time had been a factor in discouraging use of the railroad. As a result a strenuous effort has been made to keep



Dining and Observation Cars on the South Shore Line

The two upper views show the observation platform of a South Shore Line parlor-observation car and the exterior of a dining car. In the center is a view of the dining room of the car, and below are two interior views of the parlor car

trains on time. At the time the line was taken over late trains averaged 25 per cent of the total number. This percentage was reduced to three, during April, 1927. Due to the fact that the line is operated over single track for more than 50 miles, with 7 miles over city streets and a great number of railroad crossings in the industrial territory on its west end, this on-time record is more impressive.

New Passenger Cars Purchased

Another of the significant factors in the building of greater patronage was the installation of new passenger equipment. Twenty-five new steel cars were placed in service late in August, 1926. The cars were designed in the railroad's equipment engineering department and are most modern in every detail. They are equipped with four 210-hp. motors and are capable of attaining a speed of 67 m.p.h. They are built for multiple-unit control and their cost was $1,000,500.

A feature of their design is the separation of the smoking compartment from the balance of the car through an arrangement similar to that in steam railroad Pullmans. This eliminates the passing of passengers through the smoking compartment in boarding or leaving the car and has proved popular.

So rapid was the resulting growth of business that twenty additional passenger cars were ordered six months after the first cars were received. They are of the same general design, ten being motor cars and ten trailers. All of the seats in the twenty new cars are of the reversible "bucket" type, a departure in equipment of this sort.

Two new steel dining and two parlor-observation cars were purchased and placed in service early in 1927. They are operated on twelve trains daily between Chicago and South Bend and are considered the finest of their kind ever placed in service on an electrically operated railroad. Their total cost was approximately $180,000.

Dining and Parlor Car Service

The dining cars provide serving accommodations for 24 persons. Their interior is finished in light shades of lacquer, with carpeted floors, handsome tables and chairs and fine linens, china and silverware. The kitchens were built on an extra large scale, making possible fast service. This was done in order that short-haul passengers between Chicago and the nearby towns of Gary, East

Chicago and Hammond might finish their meals between cities, or within 37 minutes.

The parlor-observation cars seat 21 persons in individual easy chairs. They also have a smoking compartment for men and a handsomely appointed ladies' lounge. A buffet kitchen, in which light lunches may be prepared, is included. Glass-inclosed observation platforms are at either end of the cars, making unnecessary turning them at the end of the line.

Both dining and parlor cars have six-wheel trucks, a departure in electrically operated railroad equipment which greatly increases ease in riding. They are slightly longer than the regular passenger equipment.

The exteriors of all cars are finished in a distinctive shade of orange, with maroon letterboards and trimming. This color makes South Shore Line cars easily distinguishable from other railroad equipment using the Illinois Central Terminal and also tends toward greater visibility. All car equipment is of standard steam railroad width, and the passenger cars are 60 ft. in length.

"Crack" Trains Named

In an attempt at greater popularization of the dining and parlor car trains they have been given names having a close association with the district served.

The trains leaving Chicago are known as: Notre Dame Limited, Duneland Limited, Industrial Limited, Indiana Limited, Marquette Limited and St. Joe Valley Limited.

Leaving South Bend are the following: Fort Dearborn Limited, Grant Park Limited, Illinois Limited, the Boulevardier, Randolph Limited and Garden City Limited. A train known as the Chicago Theater Special leaves Gary in the evening at a time convenient for residents traveling to Chicago playhouses.

"Every hour on the hour" and "Every half hour on the hour and half hour" are the easily remembered phrases describing the leaving times of South Shore Line trains from terminals.

Schedules were arranged in this manner with the sole object of greater public convenience.

Co-ordination of Rail and Motor Coach Service

As already explained, a luxurious type of motor coach service was developed in co-ordination with that on the railroad. The main line of the coach company is operated between Chicago and Muskegon, Mich., paralleling the railroad on the Dunes highway as far as Michigan City and thence going north through the popular resort country on the eastern shore of Lake Michigan to Muskegon, 140 miles from Michigan City. Coach schedules are so arranged that there is only a few minutes' wait between the arrival of the train and the departure of the coach, and vice versa. Interchange between the coaches and trains is increasing in popularity as its features become better known to the riding public.

This operation of motor coaches many miles off the line for the purpose of enlarging the scope of territory served by the railroad proved such a valuable attribute of the service that a second line has been established, providing joint rail and coach service between Chicago and Detroit, Mich. Under the new plan Detroit passengers may board a dining car train in Chicago and, after luncheon, board a non-stop coach for Detroit at South Bend. The line is known as the "Golden Arrow." Coaches of the newest type, fitted with toilets and washrooms, permitting the elimination of rest stops, have been delivered for the run. They were scheduled to begin operation on July 22. The passengers may leave either Detroit or Chicago at noon and be at their destination 8½ hours later, a saving over other motor coach routes of more than three hours in running time.

One other instance of successful co-ordination between the Shore Line and the South Shore Line has been demonstrated at Hammond, Ind. The railroad's station at that place is about .1 mile from the business district and a somewhat greater distance from the residential area.

During the past year coach service was inaugurated between the station and the above-mentioned residential neighborhood, operating through the center of the business section of the city. The line almost immediately showed a return and traffic on the railroad has increased materially due to the convenience of the motor coach service, which was arranged to meet all incoming and outgoing trains.

Cheerful, Courteous Trainmen

While millions of dollars were being expended to improve the railroad's service, the value of the human equation was not lost sight of by the management. It may be said that trainmen and other employees coming in contact with the public seemed to fall into step with the other improvements and to increase their attitude of politeness.

Others who could not adapt themselves so readily were taught the tenets of modern railroad service. Meetings were held at which operating officials explained the principles of service as well as differences in other operating methods. Patrons were quick to note the change and many letters of commendation have resulted.

Other Incentives for Business

Passenger cars are kept clean, both inside and out. Regularly scheduled washings take place at terminals and in the company's shops. The upper third of the seat backs are covered with linen cases, giving the car interior a clean appearance.

A plan for baggage checking on trains was placed in effect with the operation of the new equipment, several units of which were built with baggage compartments. Arrangements were made with transfer companies in the terminal cities in order that through passengers might be relieved of the trouble of rechecking their baggage either to other railroad stations or to their homes.

Approximately 500 agents of the Chicago Rapid Transit Company, who are constantly in touch with a great portion of the Chicago public, and between 40 and 50 agents of the Illinois Central Railroad suburban service were taken on inspection trips of a day's duration on the railroad and motor coach line early this year. This was done in order that they might become acquainted with the service and be in a position to give first-hand information, if called upon, and in this way aid in selling it to the public.

In a later article an account will be published of the betterments made in the freight service, which proportionately have been as great as in the passenger service, and of the engineering improvements made on the property other than those in the cars and change to direct current already mentioned. An indication will also be given of the changed financial status of the company which has resulted from the present policy of better service.

Interchange of Ideas Aids the Industry

By R. P. Stevens
President American Electric Railway Association

A feature of the first fall meeting of the New England Street Railway Club was an address by the president of the American Electric Railway Association, pointing out the trends in local transportation as indicated in the briefs submitted in the 1927 Charles A. Coffin competition.—EDITOR.

EUROPEAN observers have declared that one of the potent reasons for American industrial supremacy is the readiness of industrial leaders, even though competitors, to exchange ideas and experiences and to discuss problems in common. Of no other industry is this so true as of the electric railway industry. The accomplishment or experience of one operator is ever at the command of others. For guidance one cannot do better than turn to the briefs submitted to the American Electric Railway Association in the recent Charles A. Coffin Prize contest. True, the contestants for the Coffin Award were only a few of the many successful operators of the country, yet the presentations of these twelve show such a common trend that a composite picture of their activities and accomplishments is representative of the best in the industry as a whole.

The purpose of every transport organization is to supply its communities with a service that will meet the public needs, be so acceptable that the revenues received will pay for that service, and yield a proper return to those whose investments have made the service possible, thus inviting new capital at reasonable cost to meet ever-expanding requirements.

Car Rider Pays for Service

To my mind, electric transportation has suffered from lack of service—lack of *good* service—in a highly competitive field. Our customers are the judges. They choose the means of transportation which appeals to them. They have become accustomed to the advantages and luxuries of the private automobile, which thus has become largely the measure applied to our service. To compete, our service must be high class, ever keeping step with the modern trend toward greater comfort and more luxurious living. We must meet conditions as they exist—not seek to change conditions to fit preconceived ideas of what our customers should have. It is practicable to do this. Some of the contestants for the Coffin award show how it is being done.

With public consciousness awakened to the realization that local mass transportation is essential to community progress many companies have been able to free themselves from a variety of inconsistent tax impositions that prevented them knowing where they stood from one year to the next; saved them from paying for pavement which they do not use and that only makes their track construction more costly; from sprinkling streets; from paying salaries of traffic police, or from similar charges that have come down to us from a dim and distant past. Freedom from such unwarranted burdens permits use of revenue, formerly so diverted, to give service, the thing the car rider is paying for. So, too, does relief from compulsory two-man operation when automatic equipment permits equal or better service with a single operator.

In other cities the way has been opened for improved service and the proper selling of that service by protection from piratical competition, and by allowing the transportation management to use its judgment in the choice between car and bus. In this connection, agreement of the community—as in Norfolk and Richmond—that a quarter mile spacing between routes does not impose any walking hardship should be a valuable help to companies facing demands to extend bus routes in every direction and on every street. Even a bus route requires a certain minimum population to be self-sustaining.

Superior Service Justifies Higher Taxes

In the determination of rates of fare also are found ways leading to improved and more salable service. Grand Rapids and Virginia teach the value of recognition of the right to earn a given rate of return, whether or not under a service-at-cost arrangement, while a number of those companies whose darkest days are behind them have placed in effect, or have applied for, a basic 10-cent fare.

These companies are awake to the true characteristic of the American people—the determination to have the best and the willingness to pay for it. Success in securing higher fares through consent of local bodies was not born of pity for the poor, down-trodden trolley. It was based on the definite idea of raising the standard of service to a level that would justify the higher charge for the ride.

Operating activities of the companies to reach high standards of service are manifold. The trend we find is toward the purchase of power instead of the maintenance of generation plants. This and the use of automatic substations go a long way toward simplifying the organization of interurban railways in particular.

Steel ties and welded rail for paved track; creosoted bridge timbers and ties; automatic track switches, and the like, in widespread use show what the live railway man is doing. When one property reduces way maintenance 14 per cent in four years and another doubles the car-miles to each derailment, we know that the way engineer is developing ideas of his own.

So, too, in the shops. Individual motor drive and specialized tools bought from responsible manufacturers

have replaced obsolete shafting and awkward home-made contrivances with a notable saving in man-power and improvement in results, while companies have spent liberally for modern rest rooms and wash rooms on the sound principle that better surroundings lead to better work.

It is heartening to find company after company reporting lower maintenance charges, whether due to better shop practices or to a larger percentage of modern cars. Little Rock, for instance, reports a reduction of 30 per cent, while El Paso maintains one-man cars for 1.58 cents a mile, though the equipment is not new.

In the progress toward the new day in electric transportation the rolling stock necessarily is of prime importance. The up and coming companies of today have selected their cars and buses in full realization of the fact that there are 22,000,000 deeply cushioned, pneumatic-tired private vehicles in use in the United States. Accordingly the trend is toward body design and equipment that provide luxurious comfort, ease and convenience for the rider. Slat and spring-cushioned rattan seats are giving way to leather upholstery with air cushions. Maple strip and cement flooring is being superseded by linoleum and rubber. Cabinets hide once obtrusive door engines, piping and valves. Noise diminution is studied, as in Birmingham, with resultant elimination of trapdoors, adoption of helical gearing and use of cork and cement filling for bolsters. From our sister utilities in the light and power field we are learning the value of good car lighting. The modern electric car provides well-diffused illumination of ample intensity with glare eliminated.

Car Development Has Not Stood Still

For exterior decoration the companies are seeking the color combinations that will meet the twofold purpose of attractiveness and visibility. Some, as in Grand Rapids, are reviving the fine old custom of naming cars after locally noted individuals or organizations, a pleasant gesture that helps sell rides and win public good will.

Except on the largest railways, 100 per cent one-man operation is in effect, or on its way. The favored car for this purpose is one seating from 44 to 48 passengers, such as Grand Rapids and other companies have found to make their best showing right in the automobile-owning districts. The industry needs a smaller unit, too, but it must be a better riding vehicle than the single-truck car of the past.

Without question this trend in car construction was stimulated by the bright colors and soft upholstery of the motor bus, but the buses themselves were far from perfect for mass transportation. They were too light and seating capacity was overstrained. The difference between independent operation with such equipment and operation of motor vehicles by experienced electric railway managements has been developed in many cities. A motor bus doing electric railway work requires the sturdiness and passenger-interchange qualities of a good street car. Hence the adoption of air brakes, treadle-operated rear doors and other features.

In one city development of a body with 50 per cent greater capacity—twenty seats—converted unprofitable operation into profitable operation on industrial routes. In other cities we learn that good judgment as to the capacity of buses on various types of routes marks the difference between success and failure. Standardization does not necessarily mean economy.

The line between the relative field of the electric car and the motor bus cannot be drawn definitely or permanently. If electric car development had stood still, the trolley may have disappeared from all but the largest centers by this time. But it has not stood still—it will not stand still.

If a small-town problem is to be solved, there is the example of Durham, where a deficit in 1925 promises to become a substantial surplus in 1927. There the management has retained rail operation only where the business justified, and has used the bus to replace unwarranted rail service. The encouraging fact here is that wise co-ordination proves there is a place for a popular price transport system even in a city of 45,000.

In the larger city of Norfolk is found the most drastic rerouting and interlacing of car and bus routes of recent years. The bus routes originated with "jitneys," partly parallel with car lines and partly in new territory. Nearly 15 per cent of the joint mileage was cut off in the rearrangement, the company reduced vehicle-miles approximately 10 per cent, yet carried 10 per cent more riders.

Schedule speed and traffic congestion are transportation problems in solving which the companies need and should have the hearty co-operation of the local authorities and the public.

Rerouting that has brought a 14 per cent improvement in service, combined with a more scientific system of traffic signals, accounts for the remarkable fact that the schedule speed of Chicago surface cars increased from 10.73 m.p.h. in 1921 to 11.18 m.p.h. in 1926.

We all know the serious effect the earlier traffic signal systems had on the schedule speed of street railways. The Chicago Surface management refused to suffer in silence. To it goes the credit for developing a most important improvement in signals, the use of which is declared to have increased the Loop district street capacity to 50 per cent.

The higher speeds here and elsewhere are encouraging because it is so often asserted that the rail-bound car is archaic; that the dodging bus is faster. This assertion is not borne out by the facts.

It is inspiring to note, in the face of increased traffic congestion, that nearly all the companies report reductions in the number and cost of accidents—results obtained through organized accident prevention work, prizes for safety ideas, co-operation with civic interests and safety publicity.

Improvement Made in Salesmanship

From the narratives of the contestants for the Coffin Award we can learn also how service has been placed upon a sound merchandising basis, backed up by salesmanship on the part of the utilities and their employees so that the essential convenience, comfort and economy of this means of transportation may be fully realized by the people served.

The range of publicity ideas and mediums is wide—newspapers, pamphlets, placards, posters, motion pictures, billboards, electric signs, floats in parades in almost endless train. Ride selling and good will building go hand in hand. Occasional radio broadcasts, at least, are common. Some companies engage outside talent for entertainment. Fort Worth, however, has its own quartet, its "Speed with Safety" band and now its "Interurban Theater Players."

Public good will is essential to utility success. Direct sale of the utility's service alone is not sufficient. It has civic duties in proportion to its importance in com-

munity life. In this connection we find companies encouraging their employees to be active in civic organizations and movements, whether the purpose be a community chest, public safety, a hospital, an orphan asylum, or what not.

The man on the car is the company's representative to the thousands of riders. The increased attention to training him, not only in safe and efficient operation, but in selling rides and pleasing the public, is gratifying. A step in this direction is the greater latitude allowed conductors and operators in adjusting mistakes in the payment of fare instead of requiring the passenger to spend possibly half a day in a trip to an office to recover a few cents.

Salesmanship on the cars is gaining, too, with the gradual decrease in labor turnover. Unquestionably the combination of one-man cars and automatic equipment is attracting a finer class of men, while wages are at a point that makes them look upon their work more as a permanent occupation than as stop-gap employment. Contributing to this result also are group insurance; dental, legal and medical attention, sometimes free; improved surroundings, on and off the cars; subsidies for educational purposes, and opportunity to become partners in the business through purchase of stock on easy terms.

Financial Structure Simplified

On the financial side simplification of structure is important to the end that the electric railway may be self-sustaining and its securities more marketable. What has been accomplished in this direction? Grand Rapids' service-at-cost franchise, its financial reorganization with scaling down of fixed charges, and its improved service led to a declaration of dividends in August, 1927—the first since 1918—and this utility is dependent entirely upon revenue from transportation.

The Arkansas Power & Light Company, Little Rock, in simplifying its financial structure was able to issue 5 per cent bonds to replace issues at higher rates and to find new money through the customer-ownership sale of 7 per cent preferred. Confidence in the modernization program of the Chicago, South Shore & South Bend Railroad, a 90-mile interurban, was such that investment trust certificates were marketed at 4½ to 5½ per cent. In two years this company doubled its passenger bus business through the use of better cars, operated on shorter headways at higher speeds, in co-ordination with motor trucks and trailers.

All this goes to show that the electric railways are keeping everlastingly at it. We, of that industry, have the brains, the will and the energy to keep abreast of the most exacting requirements of the public, but we cannot do it alone.

We can provide the transportation—the cheapest form of transportation known—if we have the earnings. But we are only one party to the contract. However well we do our part, we cannot succeed unless the other party to the contract—the public—does its share also.

It has been demonstrated that the people are willing to pay for good service, but the electric railway has been the football of politicians so long that it is hard for them to realize that times have changed and that the best interests of the community require a rate of fare commensurate with the service demanded.

Coal Conserved by Chicago Surface Lines

WHAT has been accomplished along the lines of coal conservation in the shops and buildings of the Chicago Surface Lines without causing discomfort is related in the Coffin Prize brief of the company.

The following tabulations for 1926 and 1927 speak for themselves:

COST OF FUEL

Year 1923	
Mean average temperature, deg.	50.4
Carhouses—5,985.58 tons at $4.69 a ton	$28,072.37
Shops— 15,500.00 tons at $3.96 a ton	61,341.88
Totals— 21,485.58 tons	$89,414.25
Year 1926	
Mean average temperature, deg.	47.9
Carhouses—4,927.56 tons at $3.70 a ton	$18,231.97
Shops— 9,808 tons at $3.92 a ton	38,490.80
Totals— 14,735.56 tons	$56,722.77

This economy has been effected by the introduction of scientific firing instructions, careful supervision and greater care in the selection of the coal.

Picturesque Loop at Miami, Okla.

LANDSCAPE gardening has made a real beauty spot of the South Main Street loop of the Northeast Oklahoma Railroad, Miami, Okla. Not many of the railway passengers see this spot, because it is located on the outskirts of the city. On account of its location beside National Highway No. 66, the so-called "Main Street of America," it is seen daily by a large number of people from all over the country.



Attractive South Main Street loop at Miami is a good advertisement for the Northeast Oklahoma Railroad

Berlin Is
Electrifying Its Stadtbahn

Direct-current third rail at 800 volts is being used. The entire system to be electrically equipped is equivalent to 316 miles

By Henry W. Blake
Senior Editor "Electric Railway Journal"



Interior of Hennigsdorf substation, equipped with rectifiers



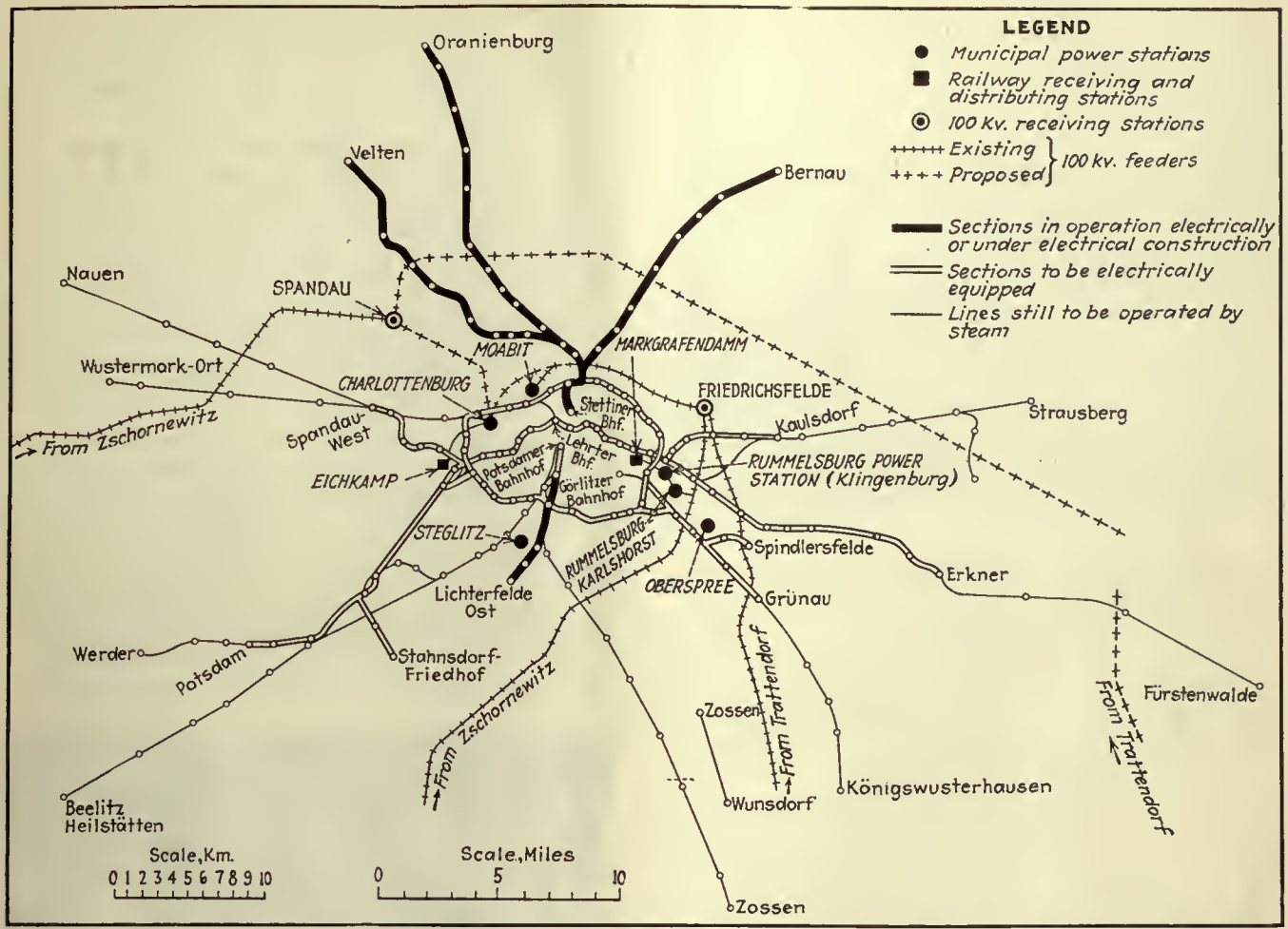
Rectifier unit with vacuum pumping equipment

BERLIN is fortunate in having excellent connections for through transportation of passengers and freight. It is the center of the large trunk line railroad system of northern Germany and, situated as it is in a broad plain, the railroads enter from all sides. Physical connection between these various railroad termini in Berlin is provided by a four-track railroad, for the most part elevated, passing through the city and by another railway around it. The former railroad is known as the Stadtbahn (or city railway) and the latter as the Ringbahn (or belt line railway). Both were built between 1872 and 1882 and have since been operated by steam as part of the national railway system. Later, some suburban extensions were added, as shown on the map.

Reference was made in an article by the writer in the issue of this paper for Sept. 24 of the important rôle played by these lines in the local transportation system of Berlin and to the work now going on in their electrification for this service. The electrical equipment of these lines—at least of two of the four tracks of the Stadtbahn—has long been under debate. As early as the year 1899 a proposition was made for such equipment along American lines by the Union Elektricitäts Gesellschaft, but nothing was done, though permission was granted this manufacturer in 1903 to equip an experimental section 9 km. (about 5.6 miles) long.

As time went on the undesirability of steam operation, especially for the local service, constantly became more apparent. It became even more so when the Berlin elevated and subway system was built in that city by a private company and the many advantages of electric train operation were brought home practically to the Berlin public. There was a special reason, however, for delay in the equipment of the Stadbahn and Ringbahn. This was that the government railroad officials for their other railroad lines had adopted the single-phase system as standard. Although these other divisions were all practically long-distance lines, the government railroad authorities expressed themselves as opposed to introducing on their city lines the customary equipment for rapid transit lines of direct current with a third rail. Instead, a plan was drafted for their equipment with single phase and a sample single-phase locomotive was built for test purposes.

Under this plan, presumably, no change in the method of operation was contemplated; i.e., it was expected that the existing trailers would be attached to an electric



Map of Berlin and neighborhood showing Stadbahn, Ringbahn and Vorortbahnen (suburban lines), now being electrically equipped. The electrical distribution system is also shown

locomotive instead of to a steam locomotive. As it was obvious that such a train would not have anywhere nearly as rapid a rate of acceleration in frequent stop service as a multiple-unit train, the remarkable suggestion was put forward that the desired high rate of acceleration might be secured by these locomotives through the means of rack rails at the different stopping stations.

Direct Current Finally Adopted

As not much progress seemed to be made with the possibility of the use of single phase on the line, studies were begun about 1920 for the equipment of the line with 800 volts direct current and the purchase of new cars, since the existing cars had been pretty much used up during the war. This system was finally adopted with a voltage of 800, as the highest that could be used with simple motors and a simple design of third rail. With this system several parts of the line have been equipped. They are indicated on the accompanying map by heavy lines and are:

1. From Stettiner Bahnhof northeast to Bernau, equipped in 1924, 22.7 km. (14.2 miles) in length.
2. From the same railroad station northwest to Oranienburg, equipped in 1925, 29.2 km. (18.2 miles) in length.
3. Schönholz-Reinick to Velten, also northwest of Berlin, equipped in 1926, 21.5 km. (13.4 miles) in length.

The lines, the electrical equipment of which is still to be carried out, are shown by the double lines on the accompanying map. The steam routes are shown by single lines. The total length of the lines shown on the map as electrically equipped or so to be equipped is about 506 km. (316 miles).

The power for the three lines already equipped is taken from the Moabit station of the Berlin Municipal Power System, which obtains the greater part of its current from the brown coal power station of the National Electrical Works over a long-distance transmission line with 100,000 volts. As for the supply of the remainder of the power required on the railway system there was extended discussion. The State railway authorities, as the owners of the railway system, took the position that a single power station should be erected at Markgrafendamm, which is within the Ring or loop, but against this plan there was considerable public opposition; based both on engineering grounds and those of business desirability. The result was that a decision was finally reached to purchase all additional power needed for the city of Berlin rather than to build a new station. The contract, which was signed in 1927, provides that both the existing national electric power stations and the municipal power station shall supply half of the power. Each will act as a reserve to the other.

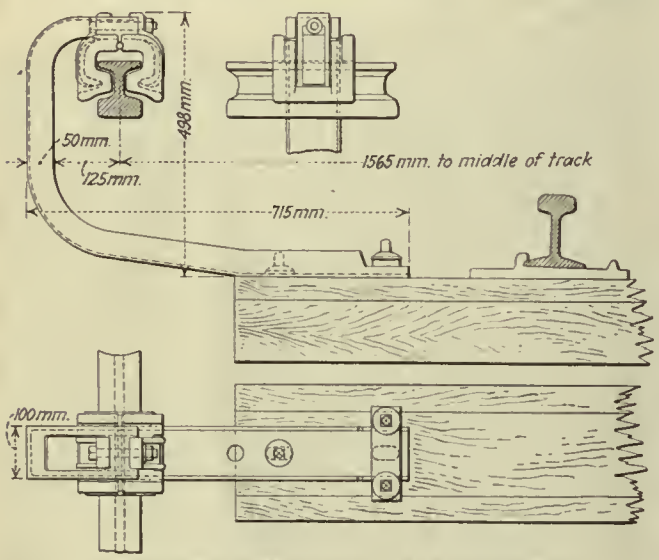
The national power station contracts to supply power from its large stations at Golpa, Trattendorf and Lauta, in the mid-German brown coal region; the city system from its Berlin power stations at Rummelsburg, Charlottenburg and Moabit, as shown on the accompanying map. The total capacity available in both groups of stations mentioned is about 800,000 kw., and the con-

tinuity of the supply is considerably more certain than from a single station owned by the railway itself. The requirements of the railway system will be about 80,000 kw. installed load and about 240,000,000 kw.-hr. yearly energy consumption. The power contracts require the stations to be ready to supply the power on April 1, 1928, and are to come in full force in 1929.

Energy will be paid for on a readiness-to-serve basis, plus a service charge. The readiness-to-serve charge is based on the cost of the generating equipment required at the maximum hourly peak. There is also a coal clause by which an adjustment will be made for any considerable changes which may take place in the price of coal. Penalties are provided in case of failure of the supply.

Power Transmission

For the long-distance transmission four double circuits of 100,000 volts will be used from the brown-coal station to Berlin. From common junction points in Charlottenburg (in the west) and in Rummelsburg (in the east) the power is taken to the railway's two distributing points, at Halensee (in the west) and Markgrafendamm (in the east). From here the railway distributes at 30,000 volts to its several substations and from there to the trains.



Under-running 800-volt third rail with protector

Since the oil switches of the substations of the railway cannot with safety take care of the enormous amount of energy of the interconnected large power centers, the contract provides that the railway generators in the several power stations shall be on circuits separate from the other generators and shall be provided with separate bus systems. The two generating stations, one supplying power to the western half of the railway system and the other the eastern half, are not designed to be connected together except in emergency, though in the future it is planned to connect them electrically through reactors. The railway, which owns the feeder system, has installed in each of its two feeding sections a dispatching station, one at Halensee and one in Markgrafendamm.

Before the plans of a standardized supply system had been completed the energy required by the three existing northern rail lines was temporarily supplied by the municipal power station at Moabit in the form of 30-kv., three-phase current. Some of the railway substations receiving this power are equipped with rotary converters. One of these, that at Pankow, is illustrated. The rotary converters, built by the Bergman Company, have an output of 2,000 kw., at 800 volts, and 2,500 amp. continuous rating at a speed of 500 r.p.m. The other substations, as well as those to be built in the future for lines to be electrified, will be equipped with mercury-arc rectifiers, as it is considered their reliability is now proved.

The rectifiers now being installed for the Ring- and Stadtbahn are being supplied by Brown, Boveri & Company, while those for the suburban sections come from either the A.E.G., Bergman or Siemens-Schuckert works. A view is given of the rectifier station at Henningsdorf. The three mercury-arc rectifiers here were built by the A.E.G. and have a continuous output of 1,500 amp. at 800 volts, or a twenty-second output of 3,000 amp. at 740 volts repeated every two minutes. One of these rectifiers with its pumping equipment is shown by itself in another view.

As explained, all direct current for the Ringbahn and Stadtbahn is converted by means of rectifiers. In every substation of these divisions there are two rectifiers and the necessary transformers and switching equipment. Each track has its own rectifier equipment, so that the power supply for the track in one direction is separate from the power supply of the one in the other direction. The third rail is also divided into as many sections as there are substations. This arrangement was adopted because it was not considered wise to connect too many of the rectifiers on the d.c. side in parallel. It was feared that in case of overloads backfiring of the rectifiers might occur, in which case all the parallel connected rectifiers would feed into the backfire short-circuit. Those sections which are normally operated in parallel can, if so desired, be separated electrically from one another. On account of the less dense traffic on the suburban sections their current supply is in one single system.



Interior of Pankow substation, equipped with rotary converters

The rectifier stations along the Stadtbahn are located in the archways underneath the structure, while those on the Ringbahn are in small buildings. All of these stations are automatically operated, with a remote control developed by Siemens & Halske.

The oil switches of the rectifier stations were supplied by Voight & Haeffner in Frankfurt a.M., while the quick-opening circuit breakers were made by the manufacturers of the corresponding rectifiers. These breakers open the circuit in less than 1/100 second, provided there is relatively small back-current (backfire).

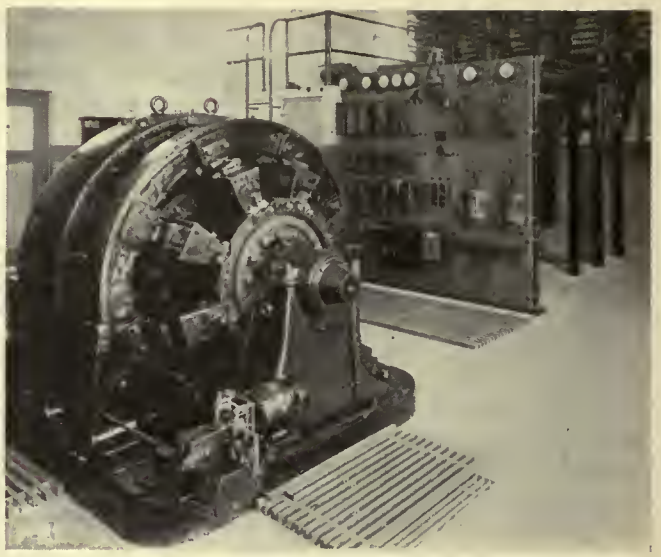
To provide further reliability in case of breakdown, a portable rectifier station is also being built and will be installed on a twelve-wheel car with trailer. This port-

able substation can be placed in front of any one of the rectifier stations and can be connected to the 30-kv. supply by an external cable. There will also be a central repair shop for all of the rectifier equipment adjacent to the Markgrafendamm substation.

Under-Running Third Rail Used

Current for the trains is distributed by an under-running third rail similar to that used on the d.c. system of the New York Central Railroad and later employed on the Hamburg Elevated's suburban lines. The third rail is of 5,100 sq.mm. cross-section of soft iron and is protected above by a wooden plank. The negative pole of the rotary is connected to the third rail, the positive to the return circuit, so that the cathodes of the converters can be grounded. The rail joints are bonded by short brazed copper bonds to form the return circuit. Before the new track was laid the rail ends were also sprayed with molten zinc to prepare them for the so-called zinc method of rail bonding. This method has also been used by the Berlin and Hamburg elevated lines, but it is doubtful whether it is of any great value.

Particulars of the car equipment and other details will appear in an early issue of this paper.



The substation is equipped with 1,000-kw. General Electric synchronous converter, automatically operated

Another Automatic Substation on the Pacific Electric

Placing of San Gabriel station in commission brings total power automatically controlled up to 25 per cent of the company's supply

WITH the placing in service of the newly erected San Gabriel automatic substation, the Pacific Electric Railway has taken another step forward to provide the latest and best equipment for power distributing service. The San Gabriel substation was officially placed in service June 15 to serve that section of the line together with the Temple extension. It is located at Las Tunas Drive and Shore Road in the city of Temple. It is designated as No. 52 and is equipped with a 1,000-kw. General Electric synchronous converter.

This new substation makes the fifteenth automatically operated substation now in operation on the system. All of the automatic equipment excepting one 1,500-kw. unit is operated in 600-volt service. The unit excepted is operated on the 1,200-volt section of the system. The total installed capacity of all the substations, both manual and automatic, is 69,405 kw. Of this amount, 17,750 kw., or approximately 25 per cent is automatically operated.

Automatic stations are operated in parallel with manually controlled stations and prove of extreme importance in their respective zones in assisting to re-establish serv-



San Cabr'el substation No. 52, recently placed in service by the Pacific Electric Railway

ice when there is an alternating-current power failure. The positive and rapid functioning of the automatic switching and control equipment restores the automatic station to service under normal conditions several minutes ahead of the manual stations.

The Pacific Electric Railway has adopted a definite policy of installing automatically operated equipment in all new substations, whether to serve new extensions or added facilities for present lines, except in substations which are important power delivery centers and which would require an attendant in any event to handle the high-tension line switching.

It has also been the policy to observe what has now become the general tendency in railway practice; that is, to install single-unit stations, located at the load centers, thereby materially reducing the otherwise heavy feeder expense, increasing the distribution efficiency, providing a more uniform trolley voltage, reducing the negative track voltage and the resultant electrolysis problem.

Maintenance and Inspection Schedule

The maintenance of and particularly the methods and systems of inspection for automatic substations have received very careful study as a high standard of service is expected and must be obtained from the equipment. Apparently the complicated system of relays and contactors offer many sources for failure, but actually the reliability of the devices has been developed to the extent that failures are remarkably few.

An inspection schedule has been devised which has proved very effective in maintaining the required routine for properly inspecting and maintaining the stations. The inspection and general maintenance of the stations is performed by six automatic substation inspectors, which includes one inspector in a supervisory capacity having charge of all inspections, who in turn reports to the chief operator of all the substations. The work has been equally divided so that the various inspections and other duties scheduled can be performed regularly.

In general the substations are visited once a day and given a general inspection without shutting down equipment. Twice a week the equipment is shut down, cleaned and any necessary adjustments made. Small car-type air compressors are installed at all substations to furnish compressed air for cleaning.

A card system has been arranged for each station which is a positive guide to the inspector as to his duties. A schedule indicates the card number, which in turn specifically describes the duties to be performed on any particular date. The card index in each substation shows when each piece of equipment was inspected and when any failures occurred and adjustments were made. This service is a good guide as to the adequacy of the attention given the equipment as well as any weakness in it.

Each substation is equipped with a combination graphic-recording direct-current voltmeter and ammeter with extra pens that show in the same chart when the alternating-current starting and direct-current line contactors came in.

The automatic substation inspectors are selected from the ranks of the manual substation operators and are men who are particularly adapted to this class of work, as well as being thoroughly familiar with substation equipment and distribution characteristics of the system. While the inspectors are responsible for the general maintenance and condition of the automatic substations, all heavy repairs and overhauling work are performed by the regular substation maintenance crews.

How Birmingham Company Cares for Conventions

In its 1927 Coffin brief the Birmingham Electric Company tells of the special facilities it provides when conventions meet in Birimingham

WAYS in which the railway gives traveling information to delegates during the large conventions held in the city are outlined in the brief which the Birmingham (Ala.) Electric Company filed for the 1927 Coffin Prize. One of these conventions during the past year brought 30,000 visitors, and another 10,000 visitors, to Birmingham.

As an aid to traffic at these times a booklet published by the company and entitled "Places of Interest in Birmingham and How to Reach Them" has been found most useful. This booklet contains a classified list of all important parks, theaters, places of amusement, manufacturing plants, hotels, etc., in Birmingham, with directions as to how they may be reached by street cars. The schedules and routes of each street railway line are shown. In the back of the book is a folded map of the city and its environs, showing the routes of all street car lines.

Prior to a recent convention a copy of this booklet was given to each trainman with a letter from the superintendent, urging him to familiarize himself with the contents and consider himself a committee of one to furnish all available information to convention delegates and other strangers. Each police officer in the city also received a copy of the book with a similar letter from the Chief of Police.

Information booths were erected on one of the principal downtown corners and at the Municipal Auditorium, which served as convention headquarters. Specially trained men from the transportation department were stationed in these booths. They wore neat uniforms with "Street Car Information" lettered on their caps in gold braid. Besides giving information about trolley schedules, they also kept themselves informed as to the convention proceedings, the arrival and departures of trains, etc. Their services were commended by local people as well as by many strangers, showing this service was appreciated. Pamphlets giving the routes and terminal leaving times of each line were also distributed freely among the delegates. By the pursuit of this policy, it is believed that many strangers in the city who would otherwise have used taxicabs were enabled to use the street cars.

In addition to the small maps mentioned, the company some time ago issued a large map showing its lines and all principal points of interest. Framed maps of this kind were then presented to the hotels for display in the lobbies, to the railroads to be hung in the stations, to the Y.M.C.A., Chamber of Commerce, etc., to be placed where they could be consulted. The frames of these maps are of mahogany and bear the inscription in gold letters, "Where Do You Want to Go? The Street Cars Will Take You There." The point where the map is displayed is marked in red on each map.

These maps proved so popular that the company had a large number of requests for them. Among them was one from the superintendent of schools, who asked to have one of these maps hung in each of the 70 public schools in the city.

Insurance Problems

of Motor Vehicle Common Carriers

By Henry Swift Ives
Vice-President Casualty Information Clearing House, Chicago, Ill.

Speaking before the National Association of Railroad and Utilities Commissioners at its annual convention held at Dallas, Tex., Oct. 18-21 *Mr. Ives discussed some of the difficulties encountered in connection with the underwriting of liability and other insurance for motor carriers. The following article is an abstract of his paper.*—EDITOR.

MANY stock casualty companies backed by sufficient reserves and equipped with proper service facilities to handle motor vehicle common carrier liability insurance are very shy about writing this kind of business. The rates charged usually are considered extraordinarily high by the buyers and hardly high enough by the insurance company. The immediate problem, then, is how sound liability insurance protection may be made available at a price sufficiently low to work no hardship on the operators and at the same time at a price which will permit insurance underwriters to engage in such undertakings expecting to provide sound protection and efficient service at a reasonable profit.

Two outstanding difficulties must be overcome in stabilizing this liability insurance, both of them being within the regulatory authority of the state railroad and utilities commissioners. They are, first, reduction of accidents through safety measures, and, second, simplification, clarification and uniformity of insurance regulations.

ACCIDENT REDUCTION

There can be little hope, in my opinion, of any material reduction in the cost of liability insurance until there is a decided reduction in the present accident frequency due to the operation of motor vehicle common carriers on the public highways. Several bus lines operated by steam or electric railways during the last year have made admirable accident prevention records, and the same is true of a few scattered so-called independent companies. However, there is much room for improvement, and for the general average of independent operators there isn't much to be said except that they have difficulty in getting even poor insurance at a high rate. Anyone familiar with passenger buses knows of their high rates of speed. How, indeed, can a bus operator expect an insurance company to protect him at a low cost, or at any cost, against the tremendous potential risk assumed when a crowded bus goes thundering and dodging along congested public highways at express train speed? Even under existing rates the insurance of this kind of public transportation has been far from profitable or desirable from the standpoint of the leading stock casualty companies.

Concerning accident prevention, there are some safety requirements, in addition to speed regulation, which seem to be of importance, as follows: Drivers should be carefully picked and not under 25 years of age. The roads over which motor vehicle common carriers operate should be suitable and no certificate should be granted for operation of an inherently dangerous highway. All employees of the transportation company should be trained in safety work and accident prevention. The company should have inspectors constantly on the job detecting violators of safety codes and recommending improvements. In the Northern states great care should be exercised in road clearing for winter operations. There should be some regulation of competitive lines covering the same route, as speed is often an influential factor. The mechanical condition of all vehicles should be perfect. State utility commissions should have a force of inspectors seeing that all safety regulations are being enforced.

INSURANCE REGULATION A "MESS"

The present situation as to insurance regulation can aptly be called a "mess." This is due to the sudden growth of this sort of transportation and the hurry with which its problems had to be met. Each state has its own statutes, rules and regulations, adopted with little or no reference to any other state. Some of them are good, some bad and some of indifferent value, but the lack of uniformity is costly to bus operators and vexatious to insurance companies. This is particularly true in the case of interstate operations, where both the transportation agency and the insurance underwriter are compelled to go to considerable expense in meeting the diverse and often conflicting requirements of the various states through which the business is conducted.

Another feature of this situation deserves attention. Because again of this lack of uniformity in regulation no pure premium statistics are available and there is not today any adequate statistical data upon which proper rates may be predicated. The experience in any one state is of necessity limited and seldom is of sufficient volume to form a background for local rates. In trying to arrive at a national or sectional tabulation to form a rate basis it is also found to be impossible to adjust the $5,000 maximum liability for any one bus in New York to the maximum of $75,000 in Wisconsin, of $80,000 in Nebraska and $25,000 in Colorado. To write liability insurance scientifically there must be present a body of experience sufficient to afford a basis for judgment concerning the probable loss ratio. That body of experience is not available at present and hardly can be until there is some uniformity in regulation. The National Bureau of Casualty and Surety Underwriters has been working on this problem for a long time, but as yet has not been able to promulgate a rate manual which is or can be literally followed by the subscribing companies. As a result rates more often are determined through individual bargaining between the insurance underwriter and

the insured. This largely could be corrected by uniform statutory and commission regulation such as has been suggested.

The accompanying table shows some examples of the wide variation in public liability and property damage limits required in several states.

Motor vehicle underwriting is an extremely hazardous one and there has been general complaint that some of the insurance organizations engaged in the business have either collapsed when faced with large losses or have failed properly to settle just claims. The stock insurance companies were organized to write this kind of business, they want to write it and will write it freely and at satisfactory rates if conditions are such as will permit them doing so without jeopardizing their solvency or their service.

You will note that in my remarks I have confined myself to discussing liability insurance and its running mate, property damage insurance. I have not tried to distinguish between them or to discuss bonds as a substitute for them or to distinguish between bus and truck insurance or bonding. The same general principles cover all of these factors, although the problems as to insuring or bonding truck common carriers licensed by the state are not nearly as acute as those affecting bus insurance.

In conclusion, there are two related matters which I wish to call to the particular attention of the members of this association.

Interstate Operation

The first has to do with the interstate operation of motor vehicle common carriers. In my personal opinion a uniform system of insurance regulations worked out and adopted by the state commissions in co-operation with the insurance companies and the transportation operators will do more to counteract this demand than any other plan that could be devised. If, for example, Illinois, Indiana and Michigan had the same safety code and the same insurance requirements in connection therewith there would be no possible need for federal control of the Chicago-Detroit bus lines. There is hardly a phase of bus operation, except possibly rates, that cannot be regulated by rulings of the state commissions in connection with insurance contracts.

Speaking as an individual solely, and not as a representative of any insurance organization or company, I am opposed to any further centralization of power in Washington unless absolutely necessary. In this particular instance I see no immediate necessity for federal intervention and I hope that necessity may never arise. Some of these alleged public necessities, however, often are manufactured to meet certain needs, and it seems to me that this may be one of them. It stands to reason that if the Interstate Commerce Commission begins to regulate buses and trucks in interstate business it will not be long before it regulates buses and trucks owned by the same operators but engaged in intrastate business. To my way of thinking the best way out of this dilemma is for the state commissions to adopt uniform safety and insurance codes under which buses and trucks may be controlled no matter how many states they pass through, the insurance contract being the key to the situation.

Public Ownership

The second of these two related matters has to do with the ever-present agitation for public ownership. Because of the inability of certain motor vehicle common carriers to obtain adequate insurance at what they believe to be fair rates there has grown up in some quarters a demand that the states go into the business of writing that kind of insurance, thus diverting losses to the pockets of the taxpayers.

PUBLIC LIABILITY AND PROPERTY DAMAGE LIMITS IN SEVERAL STATES

State	Seating Capacity of Bus	P.L. Limits	P.D. Limits
New York	All buses	$2,500/ 5,000	$500/1,000
Ohio	7 passengers or less	6,000/12,000	1,000
	8-12 passengers	6,000/18,000	1,000
	13-18 passengers	6,000/24,000	1,000
	19-24 passengers	6,000/30,000	1,000
	More than 24 passengers	6,000/36,000	1,000
Colorado	12 passengers or less	5,000/10,000	1,000
	13-18 passengers	5,000/15,000	1,000
	19-24 passengers	5,000/20,000	1,000
	More than 24 passengers	5,000/25,000	1,000
Wisconsin	6 passengers or less	10,000/20,000	No P.D.
	7-15 passengers	10,000/40,000	No P.D.
	16-24 passengers	10,000/50,000	No P.D.
	More than 24 passengers	10,000/75,000	No P.D.
Nebraska	12 passengers or less	5,000/20,000	1,000
	13-20 passengers	5,000/40,000	1,000
	21-30 passengers	5,000/60,000	1,000
	More than 30 passengers	5,000/80,000	1,000

I wonder if you realize the danger involved in any government ownership scheme affecting insurance. I am sure you do as to other industries said to be affected with a public interest, but I hardly believe that you ever have visualized the much greater danger to our fundamental institutions which lies behind the socialization of insurance, and I also doubt if the motor vehicle common carriers who may have suggested such a scheme realize the social and economic outcome if they should win their point. Assumption of risk is the most essential element in the production of wealth and the institution of insurance is the risk bearer of industry. Eliminate insurance as a factor in business and our whole well-knit industrial system would collapse. Repress it unduly or stifle its growth and every individual in the social organism will suffer.

Akron Lays New Track in Record Time

WORKING day and night, from a Monday morning until the next Friday morning, the Northern Ohio Power & Light Company recently laid a new double track on Main Street, Akron, from State Street to Exchange Street, covering ½ mile. While the work was in progress 65 cars every hour passed over a temporary track on that street.

The first step was putting down the temporary tracks Monday morning. Then came the removal of the old tracks and the old concrete. A concrete breaker and a steam shovel removed old slabs of concrete weighing as much as 500 lb.

The same type of construction marked this job as used on all other track laying being done by this street railway. There is a 10-in. concrete base with 95-lb. steel rails, all welded, steel ties and brick pavement.

The trench was graded, the foundation and new rails were put in and finally the concrete and paving. The concrete work was all done between 5 o'clock one afternoon and 10:30 o'clock the next morning. The joints were thermit welded between 7 o'clock in the morning and midnight.

The Main Street "white way" supplied sufficient light for the night work, making it unnecessary to put in floodlights. Thousands of persons gathered along the sidewalks both day and night to watch the work. The city co-operated with the plan to finish the job as quickly as possible by routing all vehicular traffic off the streets.

Electric Railway Journal Maintenance Data Sheet

ROLLING STOCK—ELECTRICAL—25

Adjustable Sling for Armatures

WHERE the end method of dipping armatures is used, some type of sling or support is desirable for handling during the dipping operation. The accompanying illustration shows an adjustable sling used in the shops of the Grand Rapids Railroad, Grand Rapids, Mich. It consists of two arms with hooked ends at the bottom that grab under the end bell. The tops of these arms are drilled with three pairs of holes, so that a crossarm can be inserted to support the upper end of the shafts of armatures of different sizes. The illustration shows the crossarm in the top set of holes. Where shorter armatures are dipped, it is moved down to a position to accommodate the shorter shaft. The side arms are made of 1¼-in. x ½-in. stock, and the crosshead at the top is in two pieces bolted together to form openings at the ends for the side pieces and to provide an opening in the center for the shafts.



Armature held by adjustable sling while being dipped in the shops of the Grand Rapids Railway

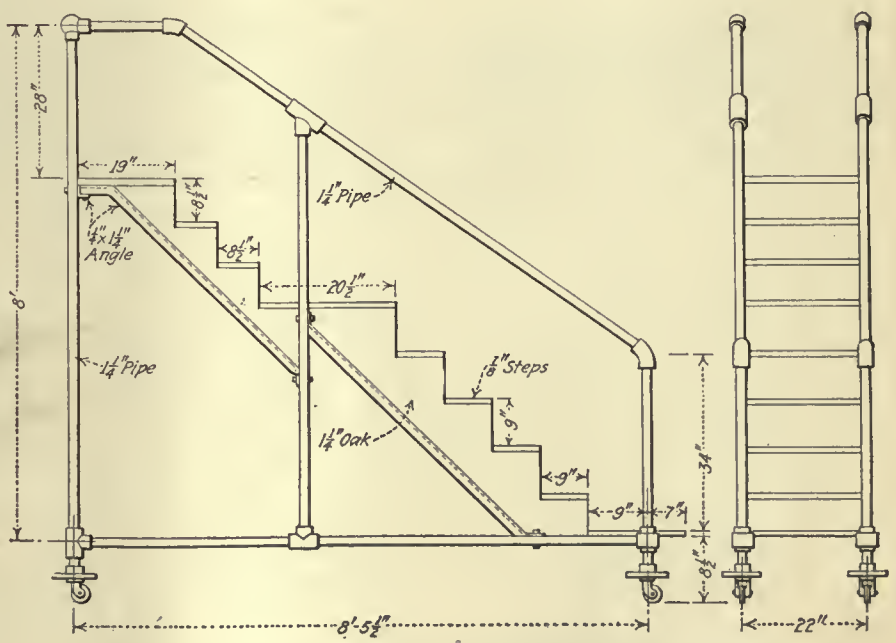
Electric Railway Journal Maintenance Data Sheet

ROLLING STOCK—PAINT SHOP—3

Rolling Steps to Replace Scaffolding

IN ORDER to speed up painting without the need of scaffolding, many railways are using some kind of a portable platform. The accompanying sketch shows the rolling steps designed and built in the shop of the Louisville Railway, Louisville, Ky., by John Zoll, master mechanic.

The framework is made of angles and pipes with four casters to permit easy rolling about the shop. Cross angles ¼ in. x 1¼ in. are bolted to the frame and support ¼-in. x 1¼-in. angles to which the 1¼-in. oak step risers are fastened. A 1¼-in. iron pipe railing starts from the bottom step and extends upward so as to surround the platform. This protects the workman, especially when he must reach over to paint some place difficult to reach. The stairway is 22 in. wide from center to center of handrail. There are two platforms, one at the sixth step and the other at the top. The painters can work at two different levels.



Painters can work rapidly at two heights with this movable platform built in Louisville

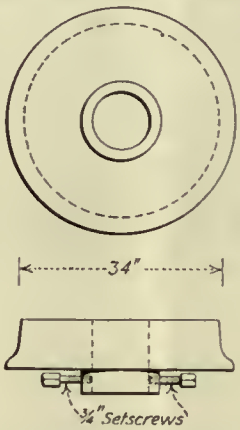
Electric Railway Journal Maintenance Data Sheet

ROLLING STOCK—ELECTRICAL—26

Car Wheel Used for Bearing Chuck

SIMPLE but effective is the chuck for internal boring of motor axle bearings that has been developed in the shop of the Washington, Baltimore & Annapolis Electric Railroad by J. A. Mellor, master mechanic. This chuck consists of a standard 34-in. steel wheel bored to fit exactly the external diameter of the axle bearings. Two ¾-in. set screws are installed diametrically opposite in the wheel hub.

A bearing to be bored is placed in the wheel bore with the flange resting against the hub, and the set screws are tightened to prevent the turning of the bearings. The wheel is placed on the boring mill table and the bearing bored out in the same manner as a wheel axle fit. Since this chuck is self-centering considerable time is saved in the lining up and boring process.



General appearance of car wheel axle bearing chuck used by W., B. & A.

In the W., B. & A. shop one man takes care of all of the wheel boring work. Frequently there is not sufficient wheel work to keep him busy throughout the entire day, in which case the bearing wheel chuck is placed in the boring mill and bearings are bored out.

The chuck has been in use for about a year and has proved very satisfactory. Due to its self-centering feature bearings can be bored rapidly and accurately. This chuck has provided a means for keeping the boring mill and operator busy.

Electric Railway Journal Maintenance Data Sheet

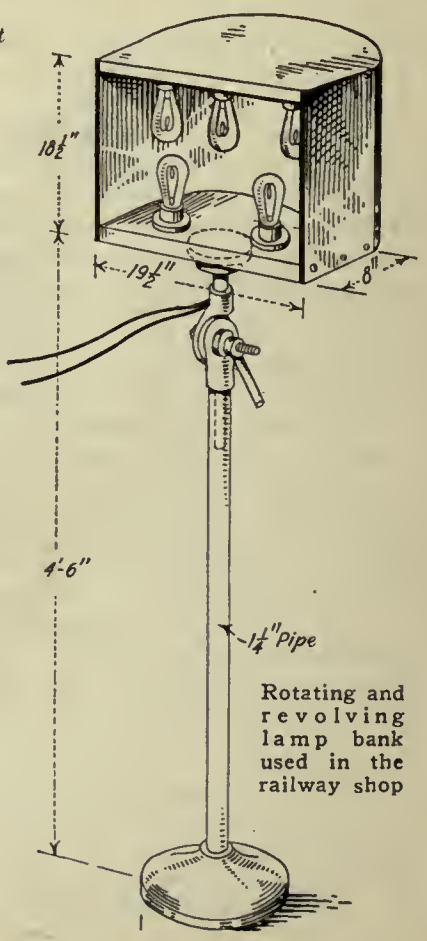
ROLLING STOCK—PAINT SHOP—4

Adjustable Portable Lamp Bank

REALIZING the importance of proper illumination as a vital factor in securing good workmanship led C. W. Wood, master mechanic of the Virginia Public Service Company, Hampton, Va., to design for use in the railway's shops the lamp bank shown in the accompanying sketch. It is portable and will permit of light reflection in almost any direction. It can be revolved 360 deg. horizontally or rotated approximately 300 deg. vertically. A substantial conical cast base, ¾ in. thick and of 14 in. diameter, gives the unit a low center of gravity and prevents it from being tipped easily. It is 6 ft. ½ in. over all. A 1¼-in. and a ⅞-in. semi-circular oak plank are spaced 18½ in. apart and incased on the curved surface with ⅛-in. sheet iron. This sheet iron cover is fastened to the oak blocks with wood screws and the inside finished with aluminum paint for reflection.

Three lamps are installed on the upper or ⅞-in. plank and two on the lower or 1¼-in. plank. A 1¼-in. pipe is connected to the base and the lower lamp support through a floor flange and an adjustable locking joint. This joint contains a lever by which the lamp can be adjusted to any desired angle and locked at the fixed point. The lower part of this adjustable joint is turned to a smaller diameter and set inside of the 1¼-in. pipe, the shoulder of the turned section resting upon the wall of the pipe. This permits the lamp to be revolved freely to any desired position. The lamps are wired five in series and the wires enter the lamp stand through the upper portion of the adjustable joint.

This stand has been found very useful in the paint shop and very often it is used by the maintenance of way department, for night reconstruction work.



Rotating and revolving lamp bank used in the railway shop

Electric Railway Journal Maintenance Data Sheet

ROLLING STOCK—ELECTRICAL—27

Fish-Tail Cutter for Knobs

FOR finishing bolt heads or knobs which have a rounded surface a tool which has been termed a fish-tail cutter has been devised and is used in the 39th Street repair shop of the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y. The tool consists of round tool steel flattened down at the ends and provided with cutting edges so as to finish material to the desired radius.

The accompanying illustration shows a pair of these fish-tail cutters such as are used for finishing the ends of the red fiber knobs used on master controller handles. These knobs have a concave finish at one end and a convex finish at the other. The tool shown at the left is used for finishing both of these surfaces. It consists of two parts, the tool holder and the cutting portion. When placed in the holder the cutting portion is clamped in position by a set screw. It will be seen from the shape of the two ends of this cutting tool that one will give a convex finish and the other a concave finish to the handle knob.



Fish-tail cutter as used for finishing the knobs of master controller handles

Electric Railway Journal Maintenance Data Sheet

ROLLING STOCK—ELECTRICAL DIAGRAMS—3

Armature Winding Diagram for Westinghouse 306 Motor

PROPER winding of Westinghouse type 306 railway motor armatures is shown in the accompanying diagram. It is very important that connections be made correctly whenever the armatures are rewound.

To Lay Off Winding

1. The center line of the starting coil is on the center line of the armature tooth between the fourth and fifth slot and on the center line of the mica between the 30th and 31st commutator bar.

2. Starting at bar No. 30, count back clockwise to bar No. 1 and in this bar place lead No. 2, the first active coil, from the bottom leads of the starting coil.

3. Count from bar No. 1 counter clockwise to bar No. 58 and in this bar place lead No. 2, the first active coil, from the top leads of the starting coil.

Winding Data

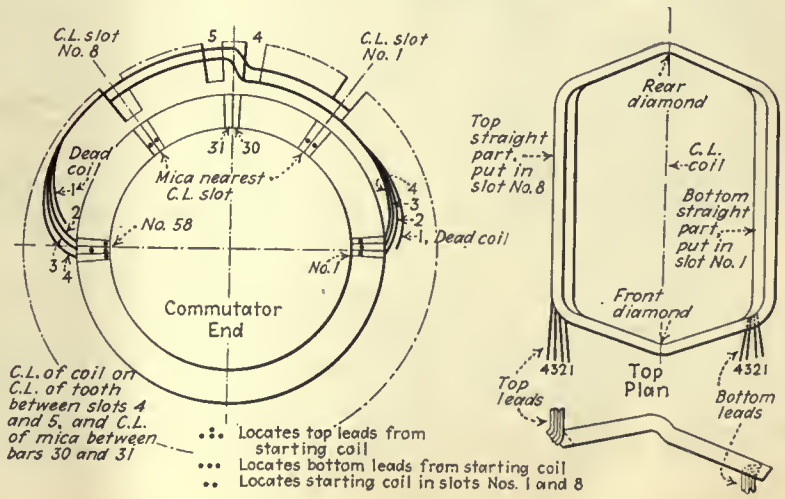
Number of armature slots, 29.

Number of commutator bars, 115.

Coils lie in slots Nos. 1 and 8.

Leads connect to bars No. 1 and No. 58.

For convenience in rewinding it is the practice of many of the manufacturers to center punch commutator bars on the end. The accompanying diagram gives the center punch marks that are standard for this motor.



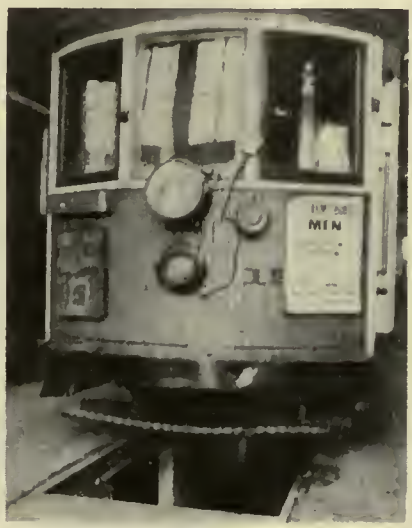
Electric Railway Journal Maintenance Data Sheet

ROLLING STOCK—ELECTRICAL DIAGRAMS—4

Arc Headlight Receptacle Removed from Splash

CONNECTION for the arc headlight on certain cars of the Connecticut Company has been changed from a position near the bottom of the front dasher to a position about one-quarter way up from the bottom of the off-side front vestibule window post.

The work has been done at the New Haven shops of the company. This connection consists of a wood block surrounding a porcelain receptacle.



Headlight connection on front vestibule window post is well removed from splash

A flexible wire terminating in a plug connects the receptacle and the arc lamp, which is supported on a horizontal iron bar on the dasher immediately below the middle front window. This bar is grounded and furnishes the other electrical connection for the lamp. In its new position the receptacle is not subjected to splash from the truck and roadbed as it formerly was, and its maintenance in good condition is much simpler and easier.

Electric Railway Journal Maintenance Data Sheet

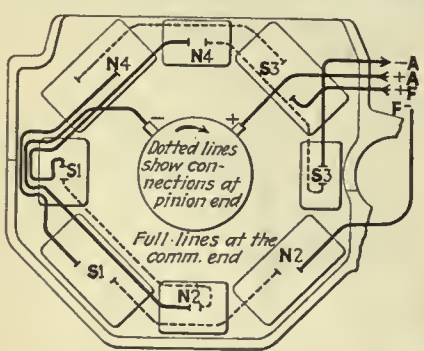
ROLLING STOCK—ELECTRICAL DIAGRAMS—4

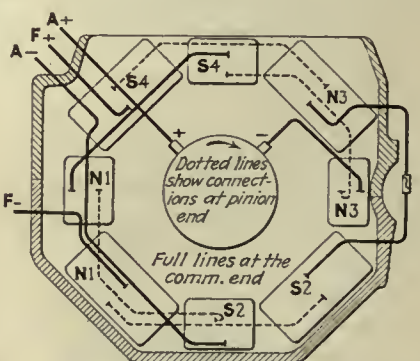
Field Winding Diagrams for Westinghouse 306 Motor

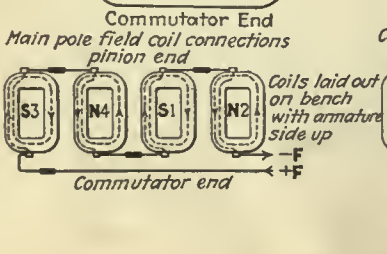
DIAGRAMS shown herewith are for wiring of the Westinghouse type 306 railway motor with commutating poles, which is used quite extensively. The diagram to the left is for motors with leads on the axle side and the diagram on the right is for motors with leads on the suspension side.

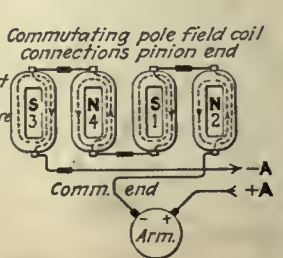
To insure that the pole faces of the motor have proper sequence of polarity it is necessary that the coils be installed correctly and it is desirable that they be given a polarity test. Time and labor are saved if such a test be made before the coils are installed with them laid out on a bench. Another test should also be made after they are assembled.

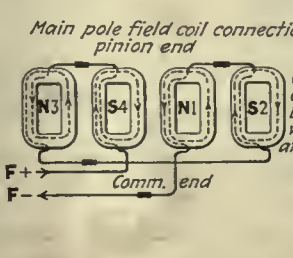
In the accompanying diagram, *N* stands for north pole and *S* for south pole. Polarity should be checked with a compass while current is being passed through the coils.

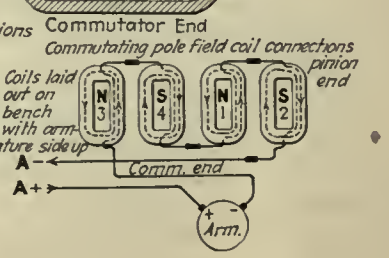












New Equipment Available

Grinder with Pulley for Driving Other Machines

DESIGNED for use in small shops where it is desirable to have the motor available for other work, a grinder has been announced by the Master Electric Company, Dayton, Ohio. The particular feature of the machine is a combination pulley and



Grinding motor with pulley so that it can be used for power drive

adapter for holding the grinding wheel, which fits on the motor shaft. The unit can thus be operated as a power motor by using the grooved pulley which is between the end of the motor frame and the grinding wheel.

New Types of Mazda Lamps for Car Lighting

SINCE the standard line of inside frosted Mazda lamps for general lighting service was introduced about two years ago, electric railway operators have been interested in their availability for car lighting. This question was answered on Oct. 1 by the Mazda lamp manufacturers, who announced the standardization of a 36-watt A-21 inside frosted Mazda lamp for five-in-series operation. They also announced a 30-volt, 1-amp., A-19 and a 30-volt, 1.6 amp., A-21 Mazda lamp for twenty-in-series operation.

The engineering departments of lamp manufacturers have been engaged for a long time on the problem of developing lamps for electric railway service that would be most efficient and sufficiently rugged to withstand the severe service of car lighting. Many laboratory experiments have been conducted in developing various filament constructions, followed by extensive tests on the lamps in actual service. The results of these experiments have now been crystallized in the three new lamps just announced. The 36-watt, A-21 inside frosted lamp is designed at 105, 110, 115, 120, 125 and 130 volts for five-in-series operation and is adaptable to existing installations in cars as well as being interchangeable in circuits with the present 36-watt S-19 clear bulb lamps. No modification of the wiring or sockets is necessary.

The 30-volt lamp in the two current ratings is designed for operation twenty-in-series on 600 volts and, of course, requires a change in the wiring of existing cars as well as a special short circuiting type of socket, but these lamps are of the gas-filled type, more efficient and producing a better quality of light than the vacuum lamps for five-in-series operation. Many of the new cars are being equipped for them and several railways have rewired their older cars. In addition to the advantages of better efficiency and better quality of light, these lamps are equipped with an automatic self-contained short-circuiting device so that the failure of one of them does not extinguish the remainder of the series.

Combination Welder and Punch Press

COMBINATION of an automatic spot welder with a punch press in one machine is announced by the Gibb Welding Machines Company, Bay City, Mich. Spot welds are made in a fractional part of a second by means of an especially designed transformer and a precisely timed automatic switch. It is claimed that the rapid method of welding eliminates depressions in the surface, warping or discoloration, as the weld is made before heat has an opportunity to soften the outer surface of the material.



New welding press

The welding press has a smooth toggle action which brings the welding point into contact lightly with the work, and a final closing pressure is applied. The machine is adapted particularly for attaching ears, clips or lugs to various metal parts.

Monthly Maintenance Contest Continues

MANUSCRIPTS are being received for entry in the maintenance men's contest for monthly prizes, subject to the following conditions:

1. Any employee of an electric railway or bus subsidiary may compete.

2. The author does not need to be the originator of the idea.

3. Articles may be submitted by several persons or by a department.

4. Any maintenance practice or device for electric railway or bus repairs may be the subject.

5. Articles should be 100 to 200 words long with one illustration, and in no event longer than 400 words with two illustrations.

6. Illustration material may be in the form of drawings, sketches, blueprints or photographs. All sheets should be marked "Maintenance Competition."

7. Manuscripts should be mailed to the editor of ELECTRIC RAILWAY JOURNAL, Tenth Avenue at 36th Street, New York.

8. A prize of $25 will be awarded each month for the best maintenance idea in the group published. A minimum of $5 will be paid for each article accepted for publication. Manuscripts will be received until April 30, 1928.

9. Announcement of the winner each month will be made in the issue devoted to maintenance and construction (the third issue each month) following the one containing the item.

10. Additional details were given in ELECTRIC RAILWAY JOURNAL for April 16, pages 700-701.

Association Activities

Dorchester Extension Discussed by New England Club

Features of the new $12,000,000 rapid transit line is the topic of several papers at Boston meeting, the first of the season. Association president talks

THE first meeting for the season of the New England Street Railway Club was held at the Copley Plaza Hotel, Boston, on Oct. 27. President R. B. Stearns, vice-president Eastern Massachusetts Street Railway, presiding. The program was in charge of the Boston Elevated Railway, the first of a series of meetings to be planned, in turn, by several of the large electric railways in this territory.

E. L. Lockman, assistant to the superintendent of maintenance Boston Elevated Railway, read a carefully prepared paper on the general features of the Dorchester rapid-transit extension of the Boston Elevated Railway which is to be opened to the public on Saturday, Nov. 5. An abstract of Mr. Lockman's paper will appear in a future issue. He showed motion pictures especially taken for the occasion from a car traveling over the newly completed track. There were also construction motion pictures. Only the portion from Andrew Square to Fields Corner will be put in operation this year, he said. In answer to a question about the relation of the rapid-transit extension to existing and future facilities in the region, H. M. Steward, superintendent of maintenance Boston Elevated Railway, says that much business is going to come to this line from the southern part of the territory to be served. The previous steam railroad facilities in the region determined the routing. New bus lines will be installed as needed, but it is impossible to tell in advance just how the people will respond to the new facilities. The rapid-transit extension has resulted in a building up of the section and feeders to the rapid-transit lines will be added in accordance with the response of the patrons.

This improvement will eventually represent an investment of from $12,000,000 to $13,000,000. It will be possible to cover the distance from Park Street station to Fields Corner, about 5 miles, in fourteen minutes running time. There are no grade crossings on this extension.

Automatic Substations for the New Line

F. N. Carothers, general foreman of substations Boston Elevated Railway, treated the subject of automatic substations in an informal but effective manner, avoiding technical details as much as possible. He supplemented his paper by the showing of a General Electric motion picture film which gave the technical details in a manner easy to follow. An abstract will appear in a future issue.

Discussion on Mr. Carothers' paper brought out some sidelights on the mercury vapor converter substation, which was shown to be especially effective on systems having from 1,200 to 1,500-volt distribution. The experience of a number of railways which are using the new type of substation was cited and the impression given was that it is rapidly emerging from the experimental stage.

E. P. Locke, engineer car construction Boston Elevated Railway, read a paper on the new features of the cars for the Cambridge subway. Discussion on this paper largely centered on the use of floor material which will withstand wear but is easy to repair. There has been no trouble with slipping in connection with the duraflex which is used on the new cars. An abstract of this paper will be published later.

Mr. Stevens Speaks of Industry Trends

At the evening session, after dinner served at the Copley Plaza, several addresses were given. R. P. Stevens, president of the American Electric Railway Association, spoke on the trends in the electric railway industry, basing his remarks largely upon the briefs presented in the Charles A. Coffin Foundation competition. Supplementing his written address, he reiterated the idea that service is to be the keynote of his presidency of the association.

Give the People What They Want, Says Mr. Sullivan

Mr. Stevens was followed by Col. Thomas F. Sullivan, chairman Transit Commission of the city of Boston, who further emphasized the idea of giving the people what they want. He spoke of the excellent treatment which the local railways had received at the hands of the public and urged the giving of service so attractive as to meet the competition of the private automobile. He agreed with Mr. Stevens as to the necessity of controlling the parking evil, stating that the highways are for traffic and not for parking purposes. The streets represent too much investment to warrant their use for parking.

He referred to the coming opening of the Dorchester rapid-transit extension as far as Fields Corner, which is to occur at the end of the present week, and pointed out how beneficial this will be to one of the largest communities in metropolitan Boston. It is important, he said, to get the merchants and others to realize how close the new rapid-transit facilities will bring Dorchester to the business district of Boston. Colonel Sullivan urged a prompt solution of a local traffic congestion problem at Governors Square, where the Boylston Street subway comes to the surface.

Value of Service Information Bureau Stressed

S. T. McQuarrie, who is in charge of the New England Bureau of Public Service Information, then spoke on the services which his bureau can render. He urged electric railway men to utilize the opportunity to speak before clubs, civic associations, etc. He said that elementary information is greatly appre-

COMING MEETINGS OF *Electric Railway and Allied Associations*

Nov. 8—**Wisconsin Motor Coach Association, annual convention, Hotel Whiting, Stevens Point, Wis.**

Nov. 16-17—**Central Electric Traffic Association, Keenan Hotel, Fort Wayne, Ind.**

Nov. 17-18—**American Society Mechanical Engineers, annual meeting, Engineering Societies Building, 29 West 39th Street, New York, N. Y.**

Nov. 17-18—**Personnel Research Federation, Accident Reduction section, 40 West 40th Street, New York, N. Y.**

Nov. 28-30—**American Institute of Electrical Engineers, regional convention, Drake Hotel, Chicago, Ill.**

Dec. 1, 2—**Pennsylvania Street Railway Association, annual meeting, Scranton, Pa.**

Dec. 2—**American Institute Electrical Engineers, New York Section, Engineering Societies Building, New York, N. Y.**

Dec. 2—**Metropolitan Section, American Electric Railway Association, Engineering Societies Building, New York, N. Y.**

Jan. 16-17—**Midwest Electric Railway Association, Hot Springs, Ark.**

Jan. 25-27—**Electric Railway Association of Equipment Men, Southern Properties, New Orleans, La.**

Jan. 26-27—**Central Electric Railway Association, Cincinnati, Ohio.**

ciated by the public. The office of the committee is supplied with data which can be used by railway men in making such addresses.

The next speaker on the program was the Rev. Archibald G. Sinclair, D.D., pastor of the First Presbyterian Church, Bloomfield, N. J. His topic was "Some American Delusions." These delusions were:

1. The idea that bigness is the essential thing.
2. That individual effort can accomplish results in these days of teamwork.
3. The conception that a shallow optimism is a healthful sign.

He illustrated by means of humorous incidents the fundamental principles that quality counts rather than quantity, that individualism must be respected and that true optimism is based upon facing all of the facts.

The chairman announced that the next meeting of the club would be held under the auspices of the Connecticut Company at Hartford.

Wisconsin Bus Men to Meet

FOLLOWING an address of welcome by Mayor J. N. Welsby of Stevens Point and the reply by A. M. Schrum, Gray Transportation Company, president of the association, papers will be presented on "The Place of the Motor Bus in the Country's Transportation System," by Prof. H. R. Trumbower of the University of Wisconsin, and an illustrated talk on "Evolution of Transportation," by A. A. Engelhard, Milwaukee Electric Railway & Light Company.

In the afternoon there will be the report of the legislative committee, B. W. Arnold chairman, and the following papers:

"Procedure and Legal Aspects Under the Present Law," by Phil Porter, legal adviser Wisconsin Railroad Commission.

"Administration of the Motor Bus Law," by L. P. Atwood, director of bus transportation Wisconsin Railroad Commission.

"Safety and Accident Data," by C. M. Larson, chief engineer Wisconsin Railroad Commission.

"The National Situation," by G. P. McCallum, president Michigan Motor Bus Association.

Following the presentation of papers by the representatives of the Wisconsin Commission there will be a general discussion led by W. A. Jackson, vice-president Milwaukee Electric Railway & Light Company, and Glenn Stephens, attorney, Madison.

A question box will be conducted by Vice-President H. G. Monger of the Milwaukee Electric Railway & Light Company.

The annual dinner will be held in the main dining room of the hotel at 6:30 p.m. M. H. Frank of the Wisconsin Power & Light Company, Fond du Lac, will act as toastmaster and John Callahan of Milwaukee will be the speaker of the evening.

American Association News

"Aera" in New Form

PUBLICATION of the November issue of *Aera*, the official magazine of the American Electric Railway Association, begins the change in policy decided by the executive committee on recommendation of the committee on publications, of which J. H. Hanna is chairman.

The magazine in its new form is a 64-page book with covers, 7x10 in. in size. It carries no advertising.

"Under the new plan," states the leading editorial, "it is hoped that the particular function which the magazine performs, that of drawing closer together the association's far-flung membership, will be better accomplished by directing its pages to this primary objective. The magazine will give greater attention to keeping its readers posted on committee work, and to the interpretation of committee activity. It will endeavor to keep individual members more closely in touch with the work of the association, and will reflect more in its pages the activity of community and company sections and of geographical sectional associations to which new membership privileges are offered in the revised constitution just adopted at Cleveland."

John A. Miller, Jr., associate editor of ELECTRIC RAILWAY JOURNAL, has been appointed editor of *Aera* and will devote all the time necessary to it in order to get out a publication consistent with the needs of the association and the industry.

Next Convention to Have Exhibits

DECISION was reached on two important points at a meeting of the committee on convention location, held at association headquarters, New York, on Oct. 28. Opinion was practically unanimous that there should be exhibits at the next convention. While it may be desirable later to adopt a policy of having exhibits only in alternate years, it was thought that the industry is at present standing at the threshold of important developments and that it would be a great mistake to do without exhibits in 1928.

The date selected for opening the convention is Saturday, Sept. 22, with Friday, Sept. 28, as closing day. A number of reasons impelled the committee to select earlier dates than have been chosen in past years. If the convention is held in the new auditorium at Atlantic City, one of two locations now under consideration, it will be necessary to have all exhibits out several days prior to Oct. 8, when the convention of the American Gas Association opens there. It was thought also that dates during the latter part of September would be more convenient for the accountants than dates in early October. Another reason for preferring the new time was to eliminate interference by the World's Series baseball games which have claimed the interest of some of the delegates at previous conventions.

It was found impracticable at this meeting to make a final selection of the place to hold the convention. While there was strong sentiment in favor of Atlantic City, considerable doubt existed concerning the completion of the auditorium building there by next fall, and the organization of a suitable operating staff to handle the complicated problems of a large convention. The possibility of labor difficulties, such as have occurred there in the past, was also considered. Some of the opinions expressed favored Cleveland as a location for the next convention. Final decision on this matter was reserved by the committee until a future meeting. Options until Jan. 1, 1928, were secured for both the Cleveland and the Atlantic City auditoriums.

Special Reports in Preparation

SPECIAL reports are being prepared by the Bureau of Information and Service of the American Electric Railway Association and will be available to member companies upon request, as follows:

Bulletin No. 168—Charts Illustrating Recent Trends in Electric Railway Operations and Also Electric Railway Bus Operations. — A reproduction of a series of charts prepared for exhibition at the 1927 convention, showing trends of traffic, revenues and expenses, trends of fares and wages, growth of electric railway bus operations, distribution of bus operating expenses, bus depreciation rates in use, distribution and trend of cash fares, automobile registrations and their effect on passenger traffic, comparison of bus operating costs in 1926, 1925, etc., with an accompanying story on their significance.

Bulletin No. 169—Parking Restrictions.—Contains summaries of conditions in twenty American cities, showing the tendency during recent years toward relieving traffic congestion and speeding up street car traffic through the restriction, and in some cases the elimination, of parking in the congested centers. There is also included a section describing the establishment of public parking spaces by street railway companies.

Bulletin No. 170—Methods of Fare Collection.—Shows the various methods employed by 337 electric railway companies in collecting fares. In each case it shows whether fare collection is pay-as-you-enter, pay-as-you-leave, pay-as-you-pass, or collection-within-the-car (hand to hand), also shows the various types of registers or fare boxes in use.

Bulletin No. 171—Trend of Electric Railway Operations.—A comparative record of the revenues, expenses, taxes, car miles, revenue passengers, and operating ratio of a group of 134 companies for the first six months of 1925 compared with the first six months of 1924 and monthly thereafter, up through June, 1927. The group is also subdivided into separate similar statements for each of the geographical divisions of the country.

News of the Industry

Appraising Co-operation in America

Results of profit-sharing plan in force in Philadelphia and Buffalo amaze English economist

A MONUMENT to T. E. Mitten's forceful personality and understanding of human ambitions and desires is the profit-sharing plan in force in Philadelphia, Pa., and Buffalo, N. Y., both guided by Mitten Management. Its success, really phenomenal, is ascribed to the philosophic conception of the plan itself. Such is the conviction of Bertram Austin, London, England, student of economics in many lands and co-author with W. Francis Lloyd of the much-discussed books "The Secret of High Wages" and "Capital for Labor." Mr. Austin sailed for home on Nov. 4 after visiting more than a month in this country at the invitation of Mr. Mitten.

At an interview with him at the Hotel Plaza, New York, on Nov. 3, Mr. Austin told a representative of the ELECTRIC RAILWAY JOURNAL how intensively he had studied the Mitten plan for employee ownership of industry as applied on the Philadelphia and the Buffalo transportation systems. Detaching himself from the management, he walked about among the rank and file and found the results incredible. To think that five years ago Buffalo traction was synonymous with seething warfare and that one of the present Philadelphia leaders in the men and management scheme was some few years ago inciting rebellion against the officers makes this ultra co-operation and this "I to I" movement all the more remarkable.

PARTICIPATION BY MEN IN MANAGEMENT

Nothing today, in his opinion, could disturb the amicable relations existing between the masters and men, as he termed it, which is exemplified on the Mitten properties. Here are men owning collectively $12,000,000 and selling $18,000,000 of Mitten stock to the public of Philadelphia—men who got 22 cents an hour at the inception of Mitten management and now get 73½ cents on a road whose gross earnings were $11,000,000 when Mr. Mitten took hold and now with the same number of employees have advanced to $50,000,000. These results Mr. Austin ascribed largely to the fact that Mr. Mitten developed a trade code which disregarded labor as a commodity and introduced on the railway system the laborer as a co-operator entitled to share in the profits.

Mr. Austin, though in favor of trade unions, sees no need for their functioning under the Mitten plan of operation. In the early days of labor strife he believed they served a useful purpose, but if the Mitten plan were to become general in industry he could see less need for the efforts of the labor unions.

It will be Mr. Austin's privilege to discuss the Mitten plan of profit sharing in England, preferably on the railway properties first. On the whole, profit sharing has been unsuccessful in England and to introduce the Mitten plan abroad is fraught with many difficulties. In the first place he believed that labor union members were more numerous in his country than in this country and were more loyal to their organizations. Again, political labor was very strong, so that collective ownership of capital in any wide sense in England would run counter to trade unions. However, he believed that his country had much to learn from ours and also that we could learn something from labor conditions abroad.

It was his conviction that the Mitten plan portended great things in industry in its practical demonstration in Philadelphia and Buffalo and that its application went a long way toward solving the eternal problem of capital and labor. At least the electric railway systems in these two cities bear testimony to the salutary results in the changed attitude of labor and capital from a fighting organization to a co-operative business.

Transit Should Be a Business Matter

New York City told that with new lines under construction, city is threatened with disruption or ruin of old lines and prospects of deficit that will cost hundreds of millions

UNSATISFACTORY transit service in New York City is due to increased operating costs incident to the war and to insufficient revenues, said Major Charles E. Smith, St. Louis transit expert, before the Merchants' Association at the Hotel Astor on Nov. 1. Major Smith recently completed an exhaustive investigation of transit facilities for the city.

He said fixed fares have always been, and will continue to be, disadvantageous. Fare should fluctuate with changing conditions and service be provided at not more than cost. Better service can be given for higher fares and subways in sufficiency can be provided for comfortable transit at a reasonable fare.

Insufficient revenues are responsible for the oversights in inspection and maintenance that cause the numerous delays. The city officials share equally with the company officials the responsibility for adequate and safe transit. Distrust of operating officials lowers the morale of employees and decreases the safety of passengers.

COMPANIES PERFORM EFFICIENTLY

According to Major Smith poor transit, traffic and transportation conditions are causing industry to grow faster in adjacent New Jersey than in New York City. Transit facilities and Americanization, not the 5-cent fare, are lowering the population in lower Manhattan. The same lowering is taking place in other large cities that have higher fares. The performance of the companies under the dual contracts is being administered efficiently by the Transit Commission.

The elevated and surface lines are not obsolete nor inherently losing ventures. Both increased their traffic about 50 per cent while the subway system has been developed and a further elevated increase of 50 per cent is anticipated. Their lack of profits is due to competition of the subsidized city-owned subways. They are justly entitled to increased fares. The old elevated railways must be tolerated until a great deal more money is available than is now in sight. In the meantime their revenues should permit them to give good service. Motor buses to handle all the surface traffic would number more than fifteen times the Fifth Avenue buses at an increased cost of many millions of dollars in fares. The traffic congestion would be serious.

Major Smith said that recapture of city-owned rapid transit lines would present complicated legal, operating and financial problems, and either disrupt present routes and require more fares to be paid or possibly increased fares on the company lines. The recaptured lines would handle 25 per cent of present traffic; the other 75 per cent handled by the company lines, including the surface lines, would present a more serious transportation problem than at present.

The independent city system of subways, now under construction, is much more expensive than necessary to give transit relief and some of the lines are premature. Costs are exceeding estimates by about 30 per cent. Enabling legislation should be secured for a commission to prepare a tax roll of benefits due to rapid transit construction by the city. A tax rate should be fixed on this roll each year to spread the cost equitably between car riders and benefited property owners; owners of property not benefited should be relieved of transit costs.

The best solution of the problem requires the unification and consolidation of all transit facilities, including the new city subways, into one company, with a single fare over all rapid transit lines and transfers between them and surface lines on the most favorable basis. It is not necessary that a new company be formed, nor that any exchange of securities take place, nor that the present companies be merged.

A conference committee of the Board of Estimate and the Transit Commission should negotiate with the present companies for the joint operation of present systems and new subways under the dual contracts appropriately amended, earnings to be poled and fares to be fixed to cover not more than the cost of service, including the carrying charges on company and city investments not otherwise paid by benefit taxes.

Labor Plans to Test Interborough Injunction

Action on the offensive was taken by the Interborough Rapid Transit Company for the second time during the week ended Nov. 4 when on Nov. 3 it obtained an order from Supreme Court Justice Richard H. Mitchell directing Joseph G. Phelan and James H. Coleman, organizers of the Amalgamated Association, to appear on Nov. 11 to show cause why they should not be punished for contempt of court in violating an injunction restraining the officers and agents of the Consolidated Railroad Workers' Union, now defunct, from attempting to organize the Interborough employees.

The injunction was signed on Dec. 30, 1926, by Supreme Court Justice Delehanty and was upheld by the Appellate Division on June 25 last. The Amalgamated Association maintained that since it was not mentioned in the injunction papers the action did not lie against the association.

In support of the move to punish Phelan and Coleman for contempt the I. R. T. submitted to Justice Mitchell affidavits of a dozen employees of the Brotherhood of I. R. T. Employees, the so-called company union, and one signed by President Frank Hedley of the I. R. T. The affidavits alleged that representatives of the Amalgamated Association had made overtures to the railway men in an effort to unionize them.

In consequence of recent moves in connection with this matter prospects pointed on Nov. 4 to a test of this issue. Following the arrival of William D. Mahon, president of the Amalgamated Association of Street and Electric Railway Employees, in New York on Nov. 4 he announced that President William Green of the A. F. of L. would join him in fighting "to the bitter end" the movement characterized by him as an attempt of the Interborough Rapid Transit Company to obtain a sweeping injunction restraining the 3,000,000 members of the federation from communicating with the employees with the idea of inducing them to join the Amalgamated.

Franchise Matters in Omaha Still Unsettled

Conditions with respect to the franchise ordinance of the Omaha & Council Bluffs Street Railway under consideration by the City Council of Omaha, Neb., for some months appear chaotic as the result of the insistence by the politicians that the terms of a new grant shall include the acceptance by the company of things it is not willing to concede. It is true Mayor Dahlman has urged upon his colleagues a compromise that will be fair all around, but the desire seems to persist that a provision should be incorporated in the new grant that would permit the Council to amend the franchise any time during its 30-year life. This may possibly lead to the rejection of the grant on the part of the company, as the officials insist this would make the terms of the ordinance so indefinite that the bond issue soon to mature could not be renewed.

The present franchise expires on May 1 next and the bonds fall due on Jan. 1. The protective committee named by the bondholders is understood to favor dropping further franchise negotiations and relying upon the claim of a perpetual franchise put forward by the Guaranty Trust Company in a federal court suit brought on behalf of all bondholders.

Railway Issue to Go Before Toledo Voters Soon

For the first time in many years the railway problem in Toledo has been almost completely left out of the municipal campaign as an election issue. Only one candidate has said much about the matter and he is conceded to have small chance of election.

One reason for this is probably the fact that the Street Railway Board of Control and officials of the Community Traction Company and Henry L. Doherty & Company representatives have agreed on a basis for an amendment to the Milner ordinance so as to provide a unified bus and railway service with a new arrangement as to capital structure, with powers of the board of control changed and other features being worked into an ordinance which may be submitted at a special election at an early date. In fact, it is believed that the railway issue will be brought concretely before the voters in this new ordinance shortly after the election on Nov. 8.

A Good Stroke of Salesmanship

In participating in the Altoona "progress week" celebration, continuing for an entire week, the Altoona & Logan Valley Electric Railway featured with a display that traced the history of the railway from the horse-drawn days to the present time.

The "progress week" program was sponsored by the Altoona Chamber of Commerce and citizens' committee to "sell Altoona to Altoonans." Residents of the community, as well as visitors, were afforded first-hand information on what Altoona is, what the city has done and what the city industries do. More than 80 business firms participated, including the Pennsylvania Railroad.

The Altoona & Logan Valley Electric Railway used a display 30 ft. long, expert painters depicting the first horse-drawn car of July 4, 1882, the painting being from an original picture. There is still with the company one survivor of the horse-drawn days, Frank E. Gates, retired five years ago with a pension from the management.



Progress in Altoona reduced to the simplest terms

The first trolley, placed in operation on July 4, 1891, was shown. The center piece showed the present-day type of improved safety car. The fact was brought out that the horse-drawn car of 1882 weighed 1½ tons and cost, with the horse, $490; the electric car of 1891 weighed 5 tons, while the present-day car weighs 30 tons and cost $20,000.

The company mileage was given. The first car traveled a route of 3.25 miles. The present routes cover 60 miles for electric cars and 18 miles for buses. Company expenditures, passengers carried and capital invested were shown. Rail equipment also formed a part of the exhibit.

The display by the electric railway proved to be one of the most popular during the progress week celebration. It will be re-erected in the company offices as a permanent exhibit.

Parking Matter Up Again

Plans discussed for six weeks no-parking experiment in downtown Chicago, as suggested in traffic study

PLANS to abolish use of Chicago's downtown streets as a garage are again taking shape as a result of the charge recently made by Alderman A. J. Homan that the City Council had delayed action for more than six months on the recommendations contained in the $50,000 traffic survey prepared last year by Miller McClintock of Harvard University for the Chicago Association of Commerce.

The McClintock report provided, among other things, for the abolition of all parking in the "Loop" district, the establishment of a uniform code of traffic regulation for the metropolitan area, for co-ordination of traffic lights and for a comprehensive safety program. It also advised limitation of parking in outlying business districts to 30 minutes and the prohibition of mid-block turns.

Except for the downtown anti-parking feature, the entire report was approved last December by a sub-committee, headed by Alderman Honan and was referred to the City Council. A "Greater Chicago Street Traffic Commission" was to have carried out the recommendations, but no meeting of this committee has ever been held.

Within the past few weeks, however, steps have been taken to bring about the no-parking ban on downtown streets. An ordinance designed for that purpose was recommended to the City Council on Oct. 12 by the sub-committee on traffic regulation and public safety. It was suggested by the committee that the plan be put into effect for a six weeks trial beginning on Nov. 15 and if successful should be permanently adopted. The ordinance would prohibit all parking in this area between the hours of 7 a.m. and 6:30 p.m. daily except Sunday. A six weeks experiment, the Aldermen pointed out, would definitely settle the problem involved.

"Mr. McClintock's report showed that only 2 per cent of the people entering the Loop park cars and the business men, I think, are for accommodating the greatest number who use other conveyances," declared Alderman T. J. Bowler, chairman of the sub-committee. During the Eucharistic Congress last summer, when the anti-parking rule was in force, he added, there was not a single automobile fatality.

There has been considerable opposition to the proposed law, but Alderman Bowler said he believed none would oppose the plan as an experiment. Mayor William H. Thompson and the traffic division of the police department have declared that the question should be decided by downtown business men. The police department maintains that it would be physically impossible to do away with parking altogether and that cab stands and other exceptions would completely counteract such benefits as would otherwise be realized.

The Traffic Commission also proposes to discuss a new set of uniform laws for Chicago which will conform in general outline with the Hoover Model Traffic Code. At the present time there are nineteen different sets of regulations, one set made by the city and the others by the eighteen park boards.

More Weekly Passes

Use of the unlimited-ride, transferable weekly pass is making progress in eastern Pennsylvania, as appears from the record of installations on properties associated with the Electric Bond & Share interests.

The first installation was made by the East Penn Electric Company May 25, 1925, at Pottsville, when a $1.25 pass supplemented the existing fares of 10 cents cash and three for 25 cents token. A $1.50 pass was also added on suburban routes charging 10 cents per zone.

A second installation was made at Williamsport on March 1, 1927, when the consolidation and rehabilitation of the local lines under the name of the Williamsport Railways was accompanied by a change from 5 cents to 8 cents cash, two tokens for 15 cents and $1.25 pass.

Another installation was made on June 27, 1927, by the Conestoga Traction Company, Lancaster, when a scale of 6 cents cash and 100 tickets for $5.25 was changed to 7 cents cash, four tickets for 25 cents and $1.10 weekly pass.

The fourth and fifth installations were made Oct. 10, 1927, on the Allentown-Bethlehem city lines of the Lehigh Valley Transit Company and the lines of the Easton Transit Company and the associated Phillipsburg Traction Company of New Jersey. In these cases the fare was changed from 7 cents cash to 8 cents cash, two tokens for 15 cents and $1.25 pass.

Five-Cent Zone Fare Suggested for Oakland

A basic 5-cent fare for the local lines of the Key System Traction Company, Oakland, Cal., with establishment of zones was urged on Nov. 2 by A. G. Mott, chief engineer of the California Railroad Commission, at a rate hearing in Oakland. This recommendation was submitted to Commissioner Clyde L. Seavey.

Key officials, who ask an early decision in the rate case, are opposed to the 5-cent proposal. They are urging a 10-cent basic transient rate with weekly passes to regular riders. The 10-cent proposal was submitted as an amendment to the Mott report. The present fare is 7 cents. It is claimed that this has been found inadequate. Odd coin fares, such as 6, 7 and 8-cent rates, are condemned as bad business in the Mott report, which further suggests "bargain" fares during off-peak hours to encourage patronage and offset private automobile competition. The report pointed out that electric railways prospered on the 5-cent fare before the war and that this prosperity has waned since establishment of 6, 7 and 8-cent fares.

Quality of service must be improved, Mr. Mott pointed out, in order to compete with the private automobile. Urging economies in operation, Mr. Mott advocated one-man operation of cars with fare collectors and loaders on the ground in congested areas. A yearly net saving of $218,000 by this plan was estimated.

Carelessness at Crossings Defined by the United States Supreme Court

IN A short but sweeping decision rendered on Oct. 31, the United States Supreme Court laid down a "standard of conduct" for persons driving upon railroad tracks at grade crossings which apparently puts responsibility for accidents upon them unless they have left the vehicle and looked down the track.

Dora Goodman, administratrix of the estate of Nathan Goodman, sued the Baltimore & Ohio Railroad for the death of Goodman at a grade crossing near Whitfield, Ohio. She recovered damages in the lower court and they were affirmed by the Circuit Court of Appeals. In a decision read by Justice Holmes, the Supreme Court reversed this finding and found for the railroad, which contended Goodman's death was due to his own negligence.

The trial testimony showed that Goodman, who was driving a truck, was familiar with the crossing and slowed down to a speed of 6 to 8 m.p.h. when he approached it. It was brought out that view of the track was cut off by a section house 243 ft. from the crossing and that Goodman was within 20 ft. of the crossing before he could have seen the train which caused his death.

In reversing the lower courts, the opinion of Justice Holmes says in part:

When a man goes upon a railroad track he knows that he goes to a place where he will be killed if a train comes upon him before he is clear of the track. He knows that he must stop for the train, not the train stop for him. In such circumstances it seems to us that if a driver cannot be sure otherwise whether a train is dangerously near he must stop and get out of his vehicle, although obviously he will not often be required to do more than to stop and look. It seems to us that if he relies upon not hearing the train or any signal and takes no further precautions he does so at his own risk.

Ordinance for Philadelphia Line Rushed in Council

An important ordinance was advanced by the City Council of Philadelphia, Pa., from second to third reading on suspension of the rule on Oct. 27, providing for a single track railway on Hunting Park Avenue as part of the Erie Avenue route of the Philadelphia Rapid Transit Company, to be completed on Dec. 1. It was pushed forward at the suggestion of Charles B. Hall, president of Council, to meet a call for transportation in the section. The proposed line will form a link between the Frankford elevated and Broad Street subway. Operation of this route by the Philadelphia Rapid Transit Company will be governed by the terms of the 1907 agreement with the city, which runs until July 1, 1957.

Record Shipment Made by Union Traction of Indiana

Shipment of a carload of motors between Anderson, Ind., and Flint, Mich., recently illustrated the consideration that is being shown to patrons by the public carriers. The motors were shipped from the plant of the Delco-Remy Corporation at Anderson on a rush order to the Buick Motor Company at Flint. A representative of the Remy company called the Union Traction Company of Indiana at 11 a.m. on Sept. 28 and asked what was the best time possible on the shipment. A car was set at 2 p.m., left Anderson 4:37 p.m., Central Standard time, and was set for unloading at Flint at 7 a.m. Eastern Standard time the next morning.

Fare Compromise in San Antonio

The San Antonio Public Service Company, San Antonio, Tex., has effected a compromise with the city authorities in the matter of fare increase. Under the terms of the settlement, cash fares remain as announced under the recent increase, but the weekly tickets were reduced in price from 30 cents to 25 cents. Bus fares within the city limits were placed on a parity with railway fares, and outside the city limits the fare on either car or bus is to be 2 cents higher than within the city. The new rates also authorize the sale of coupon books good for 30 days, giving children under seventeen years of age 40 rides for $1.20 or twenty rides for 80 cents.

Several weeks ago the company announced an increase, which made the cash fare 10 cents on all car lines, against a former 6-cent fare. Provision was made for the sale of three metal tokens for 25 cents and for the sale at 30 cents each of tickets that enabled the holder to ride for a period of one week as often as he wished at the fare of 5 cents for each ride. Fare for children was raised from 3 cents to 5 cents straight. Bus fares remained unchanged, as they were already at 10 cents.

The compromise recently effected settles the matters between the company and the city which developed after the application of the former revised tariff.

Kansas City Employees Celebrate Reorganization Anniversary

Employees of the Kansas City Public Service Company, Kansas City, Mo., observed the first anniversary of the reorganization of the railway by a dinner and entertainment Oct. 18 at the Hotel Baltimore. The celebration, for the return of the management to private hands after a long period in receivership, was given under the auspices of the representation plan committeemen, the Employees' Brotherhood trustees and the directors of the employees' benefit unit. F. G. Buffe, vice-president in charge of operation; H. E. Green, president of the Employees' Brotherhood, and others made speeches.

Mail Box Attached to Cars in Miami Beach

The idea of installing mail boxes on street cars has been revived by the Miami Beach Electric Railway, Miami Beach, Fla. It is understood that the railway mail collection for the benefit of Miami Beach was put in force at the suggestion of Postmaster Pittman.

G. M. Dahl Vindicates Himself in B.-M. T. Affairs

Gerhard M. Dahl, chairman of the Brooklyn-Manhattan Transit Company, has filed an affidavit in the Supreme Court of New York County giving answers to certain questions put to him by Samuel Untermyer in the transit hearing last June. At that time Mr. Dahl refused to answer the questions. In his affidavit Mr. Dahl says that in the 90 days prior to June 8 the Brooklyn-Manhattan Transit Company sold 5,000 shares of Interborough stock and bought 2,000 shares. The greatest number of Interborough shares held by the Brooklyn-Manhattan Transit was 22,650 and the number held on June 8 was 19,650. The court did not require Mr. Dahl to go into all the details Mr. Untermyer sought when he first put his questions.

Switch Tender Blamed for Dade Park Accident

Ottis Lloyd, switch tender for the Evansville & Ohio Valley Railway, Evansville, Ind., has been held responsible in the report of the safety bureau of the Interstate Commerce Commission for the accident on Sept. 7 in which a car of the railway coming from the Dade Park race-track, near the city, plunged through an open switch, killing four and injuring more than 50 people.

Limited De Luxe Service Between Dallas and Waco

The Texas Electric Railway Dallas, Tex., has started a new de luxe passenger service on its line between Dallas and Waco. New and improved cars, known as the Blue Bonnet, operate as limited cars. Externally the cars are painted a brilliant blue and their name is derived from the Texas flower, the blue bonnet. The seats are upholstered in gray leather. They have double air cushions. The roadbed has been reballasted and otherwise improved in preparation for this new fast service.

Mike Fewell, general passenger agent, announced that service will be expanded when additional cars can be provided.

Houston Fights Over Rate Differences

A fight has been under way in Houston, Tex., between the city and the Houston Electric Company for a cut in fares charged residents of Park Place, a suburb outside the city limits of Houston on the Galveston-Houston Electric Railway. That interurban line has been giving the residents of Park Place service at an 18-cent fare. The regular cash fare in Houston is 10 cents and residents of Park Place want that rate to apply to their district.

Public Service Commissioner C. J. Kirk has asked the company to grant a 10-cent fare to Park Place with transfer privilege, as on all city lines. Jeff L. Alexander, general manager of the Houston Electric Company, has countered with an offer of a compromise, in the reduction of fares from 18 cents to 15 cents with ten tokens for $1. The city attorney has held that under the city ordinance requiring the traction company to charge the same fares to all parts of the city, the Houston Electric Company can be compelled to build a line to Park Place and institute regular service on a basis of the same fares charged on the city lines.

"Big Parade" Interests Atlantans

A "progress parade" of street cars staged by the Georgia Power Company on Sept. 27 ushered in the new "sport model" equipment which is being delivered in Atlanta. It also marked the passing of the old type car from the streets of that city. "Old Timer," the last of the single-truck street cars in service on Atlanta streets, carried the Georgia Power Company's band at the head of the procession. In the line of March was one of the 40 new cars purchased in 1922 and 1923, one of the twenty cars purchased in 1925, one of the 100 new cars purchased in 1926 followed by a new interurban. A double-deck coach purchased in 1925 to supplement street car service was next in the procession, followed by one of the single-deck coaches. Car No. 860, the first of the 40 new "sport models" re-

ceived in Atlanta, was next in line. It was followed by another car bearing a banner which said that 243 new cars had been purchased since 1921.

Express Service Under Consideration in Houston

The Houston Electric Company, Houston, Tex., under Stone & Webster ownership, is planning to establish express car service to West End and Houston Heights. It is said that the demand for express service to these outlying thickly populated districts of the city of Houston has become so insistent that it can no longer be ignored. A survey is under way to determine the amount of patronage that is likely to follow the installation of service of this kind.

All Set for Turkeys and Hams in Jacksonville

A safety contest closed in Jacksonville, Fla., early in September, indicating a new high mark for careful operation of cars by the trainmen in the employ of the Jacksonville Traction Company.

Records for the three months showed 153 operators out of nearly 220 who participated in the contest operated without a single chargeable accident, while 37 operators were held responsible for one accident each and nine for two each. Cash prizes totaling $1,142 were awarded the winners by the management.

Compensation in the next safety record will be by a turkey for the operator and a large ham for the winning conductor. This will mean a turkey for Christmas, as the period which began on Sept. 10 terminates on Dec. 18.

Toronto to Venerate Armistice Day

An outline of a suggested Memorial Service to be held on Armistice Day, Nov. 11, by the Toronto Transportation Commission, Toronto, Canada, has been despatched to every member of the organization. The plan is to have the veterans meet in front of the Parliament Buildings at 2 p.m. and march down University Avenue, place a wreath on the South African Memorial Monument, and then proceed to the Cenotaph, the monument to the fallen.

There will be no flag waving, no military uniforms at the exercises, but all united in one bond of veneration for the Toronto Transportation family, half of which served in arms the same cause with those whom the Cenotaph commemorates. The Toronto Concert Band will play from the steps in front of the City Hall when the marching veterans arrive. Hymns will be sung to the accompaniment of the band and short prayers will be recited. All friends and relatives of the Toronto Transportation employees are welcomed at the service.

Philadelphia Employees Eager to Absorb Information

More than 2,300 employees of the Philadelphia Rapid Transit Company, Philadelphia, Pa., are already enrolled in the various training and instruction courses provided by the company. The fall term of practical instruction opened during the week of Oct. 24, but applications for enrollment continue to pour into the training and educational division.

Courses are offered to employees on subjects which are directly applicable to their own jobs. Classroom groups will study stores methods, the gas-electric bus, blueprint reading, mathematics, fundamentals of electricity and public speaking. There is also to be a series of supervisory discussion groups, attendance at which will be limited to employees of supervisory rank, such as foremen, supervisors and sub-foremen. These groups will discuss the actual supervisory problems arising in the transportation, way, electrical and general office departments.

For those whose daily duties prohibit attendance at the evening classes, and for those who wish to retain the text material in printed form, a few subjects are offered in correspondence form. These courses include public relations, handling men, the electric railway industry and the ABC of the electric car. Any employee of the company may enroll for one of the correspondence courses at any time.

Classes are held in the evenings from 7:30 until 9:30 p.m. in the Mitten Building. Students are required to attend at least 70 per cent of the classes in order to obtain the engraved certificate signed by Dr. A. A. Mitten which signifies the successful completion of the course. Those enrolled in the correspondence courses must complete all of the lessons of the particular course to obtain this certificate.

Although the work of the training and educational division is in its infancy, its growth has been most rapid. The employees enrolled show astounding eagerness to absorb information which will broaden their viewpoint of their work and increase their efficiency.



Irresistible educational cartoon of Philadelphia Rapid Transit

Fare Hearing Resumed in Baltimore

Hearing of the application filed by the United Railways & Electric Company, Baltimore, asking for authority to charge a 10-cent fare was opened before the Public Service Commission on Oct. 27. The hearing is expected to continue for three or four weeks. The opening day was devoted to statements by counsel, the first being made by Charles Markell, counsel for the United. Thomas J. Tingley, people's counsel, spoke in opposition to the increase, as did Linwood L. Clark, representing the People's Corporation, which also is opposing the application by the company seeking an increase.

Charles D. Emmons, president of the United, was the first witness called. He said the rate of return in 1920 on the valuation of the company's property as fixed by the commission was 5.43 per cent. In 1921 it was 4.85; in 1922, 5.19; in 1923, 5.32; in 1924, 5.32; in 1925, 5.48; and in 1926, 5.52.

Recently the commission refused to grant the United a temporary emergency increase pending action on the application for a permanent 10-cent fare. The present fare is 8 cents straight or two tokens for 15 cents.

RAILWAY EXTOLLED FOR COURTEOUS ACTS.—An interesting missive was received at the offices of the Portland Electric Power Company, Portland, Ore., signed by 45 members of the Oregon Employment Institution for the Blind, expressing their appreciation to the railway for the thoughtful treatment extended by the motormen and conductors, especially on the Montavilla-Hoyt and Montavilla-Stark cars patronized by the members of the institution.

Recent Bus Developments

Seattle Terminal Opened Amid Great Fanfare

With speeches, music, luncheon and a parade, the new $200,000 terminal of the Pacific Northwest Traction Company in Seattle, Wash., was dedicated recently. It was opened as the central station for transportation lines, traction and motor, reaching all of the important centers of the Pacific Northwest and British Columbia. During the afternoon the building was open for public inspection.

A. W. Leonard, president of the Puget Sound Power & Light Company and also of the Pacific Northwest Traction Company, accepted the structure from the Stone & Webster Engineering Corporation, builder, and represented by W. D. Shannon, chief engineer. Mayor Bertha K. Landes, on behalf of the city, and C. Rea Moore, Olympia, supervisor of public utilities, on behalf of the state, congratulated the company and the public on the new transportation service the terminal afforded.

After the ceremonies, Mr. Leonard assisted Mayor Landes into an Everett interurban coach, and with Mr. Leonard at the controller and the Mayor at the bell rope they drove the first car from the new terminal.

The structure, which has an exterior of brick and cast stone, with a variegated roof, occupies a half block of land on Stewart Street. An arcade goes the entire length of the building from east to west, and at the west end of the building are shops, a restaurant and bootblack stand, commodious waiting rooms, together with ticket offices, information desk, public telephone booths and news-stands. In the northeast corner of the property a large space is reserved for emergency repairs to the stages that make the building the Seattle terminal. The interurban cars will enter the property from Ninth Avenue, load and discharge their passengers under a steel train shed and then continue through the property to Eighth Avenue and thence to Stewart Street. The east end of the building houses a baggage and express room and parcel checking stand. The entire structure is of mill construction, with firewalls of masonry and fireproof stair wells. Large marquees on Stewart Street and Eighth Avenue provide suitable loading spaces for both trains and stages. It is planned to decorate the grounds about the buildings with lawns, flowers and vines.



Bertha K. Landes, Mayor of Seattle, Wash., acting as conductor and President Leonard of the Puget Sound Power & Light Company acting as motorman of the first interurban car to leave Seattle's new car and coach terminal

Among the companies which have already leased quarters in the terminal are: Des Moines Auto Company, Haller Lake Transportation Company, Index Stages, Inc., North Coast Lines, Portland-Seattle Stage Company, Pacific Stages, Ltd., Puget Sound Motor Coach Company, Seattle Motor Coach Company, Shield Transportation Company, Pacific Northeast Traction Company, Wolverton Auto Bus Company and Yost Auto Company.



Interurban and stage terminal of Pacific Northwest Traction Company at Seattle, Wash., just completed at a cost of $200,000

Bus Successor to Railway in Huntington

A certificate to the Huntington Coach Corporation, Huntington, L. I., to operate a bus line between Halesite and Huntington station was granted by the Public Service Commission on Oct. 27. This company will provide transportation facilities in territory now served by the Huntington Traction Company, which, it is stated, is going out of business. The bus corporation will be owned and managed by the present owners of the railway.

Bus Service Between Dallas and Love Field

The Dallas Railway & Terminal Company, Dallas, Tex., has established bus service between Dallas and Love Field, the city airport for Dallas. During the hours of light traffic two buses are kept in operation, maintaining a 30-minute schedule. During rush hours a third bus is put in operation and a twenty-minute schedule is maintained. A 10-cent fare is charged.

Bus Succeeds Rail Line in Massachusetts

The Shelburne Falls & Collrain Street Railway, Shelburne Falls, Mass., ceased operation Oct. 29. This action followed the transfer by the Griswoldville Manufacturing Company's mill of its freight to its own bus service. The road has been in operation since 1896. It was 7 miles long. An independent bus line has succeeded to the business.

Service Started in High Point

The North Carolina Public Service Company started bus service in the city of High Point, N. C., on Oct. 9, with five new six-cylinder street car type Dodge buses. Bus service at High Point was formerly furnished by Chester Hawkins. The Hawkins lines withdrew from the city at the close of business on Oct. 8. J. H. Jennings is manager of the High Point branch.

Cleveland Park Line in Operation

A new coach line service, operated by the Capital Traction Company, Washington, D. C., between Cleveland Park and downtown Washington, was started on Nov. 1 under a twenty-minute headway. The fare is 25 cents with no standing passengers. Transfer privileges are permitted. Under the commission's order this service is to be operated for a trial period of six months.

Financial *and* Corporate

Bridge Line Offers to Sell

The Manhattan Bridge Three-Cent Line has offered to sell its equipment and surrender its franchise to the city of New York. The acceptance by the city has been recommended by Borough President James J. Byrne of Brooklyn. The price asked by the company is $184,000 with $25,000 for salvage rights for equipment. If the offer is accepted, it is proposed to use the space now occupied by the tracks for an additional vehicular roadway. Albert Goldman, Commissioner of Plant and Structures, has estimated that it would cost the city $9,000,000 to construct another roadway on Manhattan Bridge. Elimination of the surface line would permit alteration of the track space for use as a roadway at an estimated cost of about $600,000.

Mr. Byrne expressed the belief that buses could be substituted satisfactorily for the surface cars on Manhattan Bridge. The railway is operated at a 3-cent fare over the Manhattan Bridge from the junction of Flatbush Avenue and Fulton Street, Brooklyn, into the Borough of Manhattan to the terminus of the bridge there. The total length of the route is about 1½ miles.

Name for Successor Company to Boston & Worcester Approved

The Massachusetts Department of Public Utilities has approved the corporate name of the Boston, Worcester & New York Street Railway, on the petition of Henry B. Rising, purchaser of the Boston & Worcester Street Railway. The new company is now in process of organization for the purpose of operating the Boston & Worcester Street Railway, recently sold to the petitioner at receivers' sale by order of the court. Opposition by the bondholders to the proposed issuance of bonds totaling more than $1,000,000 and preferred and common stock of more than $1,250,000 by the new company has been registered before the department.

Receivership in Evansville

William A. Carson, vice-president of the Evansville & Ohio Valley Railway, operating from Evansville to Mount Vernon, Ind., Grandview, Ind., and Henderson, Ky., has been appointed receiver for the company by Judge Elmer Q. Lockyear of the Vanderburgh County Probate Court. He immediately posted a $5,000 bond required by the court. G. R. Millican, manager of the company, will continue in that capacity for the receiver.

Friendly receivership proceedings were brought against the company by Greene & Greene, an insurance company, in a suit in which it was charged that the company was insolvent and that it had not paid insurance premiums of $111 due. Mr. Carson was authorized to continue operation of the company under the direction of the court. The receivership was forced upon the company, it is understood, through low earnings over a period of years, due to the inroads into its business by the automobile and because of claims filed and damage suits pending and contemplated.

Bond Application Renewed by Brooklyn Company

It is understood that the application of the New York Rapid Transit Company, operating subsidiary of the Brooklyn-Manhattan Transit Corporation, for the right to issue $17,000,000 in 6 per cent refunding mortgage bonds for the purchase of new equipment will be granted by the Transit Commission. Commissioner Charles C. Lockwood held a hearing on the application on Oct. 28. The company first proposed to sell an issue of $20,000,000 of 5 per cent bonds to the B.-M. T. for $16,000,000. This application by the company was rejected by the commission.

Larger Net for Third Avenue Railway

Amount increased by more than $225,000. Very interesting review of affairs of company for year ended June 30, 1927, by President Huff

FOR the fiscal year ended June 30, 1927, the operating revenue of the Third Avenue Railway System, New York, was $15,332,549, an increase of $665,551, or 4.54 per cent, compared with the fiscal year ended June 30, 1926. Operating expenses were $11,494,147, an increase of $391,627, or 3.53 per cent.

The year was an eventful one for the companies in the system. A strike on the lines of the Interborough Rapid Transit Company on July 6, 1926, resulted in the diversion of a substantial amount of traffic from the subway and elevated lines of that company to the Third Avenue lines, with an abnormal showing in receipts, and to some extent an abnormal showing in net earnings. In April, 1927, there was a general increase of 5 per cent in wages on transportation lines in New York City. This increase is reflected in the operating expenses of the Third Avenue system for the last few months of the year.

During the year it was necessary to pay paving bills of previous years that had been in litigation. These amounted to about $300,000. It also became necessary to expend about $350,000 on account of capital, with the result that the actual cash surplus of the companies of the system was approximately the same as the year previous; that is, about $1,500,000. This was felt to be none too large for the needs of the railway companies of the system. S. W. Huff, president of the company, says that under the circumstances the directors felt they were not justified in increasing the 2½ per cent interest which had been paid on the 5 per cent adjustment bonds during the previous year.

Mr. Huff says the extraordinary expenditures necessary and the increase in wages prevented the financial showing, and particularly the accumulation of cash, that had been anticipated, but that the year was an eventful one in clearing up some of the uncertainty that has surrounded the operation of the companies of the system. In his review of the affairs of the company the president says:

For several years the matter of threatened bus competition has loomed large on the horizon of these companies and created some uncertainty as to their future growth. In Westchester County generally they were threatened with competition from a bus system centering in the county seat, that would seriously interfere with the future growth and development of the electric lines of the system operating in that county. The Third Avenue Railway has for a great many years carried the deficits from operation of these Westchester lines with the hope that they would, by their natural growth, ultimately provide the means for substantial increase in earnings. To have them throttled now by bus competition would mean not only to cut off this prospect of future growth and increased earnings, but would mean the loss of the advances that have been made to them during the past years.

In the city of Yonkers the situation was even more acute. The city authorities granted bus franchises to a competing company, by which they authorized the operation of buses in direct competition with practically all of our electric car lines in that city.

In the Bronx a situation very similar to that in Westchester County had developed, except that the Bronx was vastly more important, because of the extent and importance of the car lines being operated in that borough. There are three electric railways operating in the Bronx, all component parts of the Third Avenue Railway System—Union Railway of New York, New York City Interborough Railway and the Southern Boulevard Railroad. These three companies have been operated with a universal 5-cent fare and a universal free transfer throughout the entire territory of the Bronx. The Bronx is the only borough in the Greater City that has a universal 5-cent fare and free universal transfers throughout its entire territory. This has greatly stimulated street car travel, and this travel in the Bronx has shown greater increases than in any other borough.

There were populous sections in the Bronx requiring public transportation. The Third Avenue Railway, under the terms of the adjustment mortgage, was unable to

extend its lines into this territory. Bus lines, operated without legal authority, have sprung up to meet this need, until between $2,500 and $3,000 a day is being collected by these individual independent and illegal operators.

Bus Situation Reviewed

The city of New York mapped out a plan of bus operation which would include routes covered by the bus lines already in operation and others that were necessary or desirable. A well-organized bus operation in this territory might well prove a very serious obstacle to the growth and development of travel on the electric railways and to their earning capacity. These railway lines, like those in Westchester County, had been carried for a number of years during the period of development and growth, by advances from the Third Avenue Railway, although at the present time they are carrying themselves and contributing to the surplus of the system. As you were advised in a previous report, a bus company of the Third Avenue Railway System was an applicant for these franchises.

In Manhattan, also, the city authorities mapped out a bus system containing several routes that would offer serious competition with the electric car lines of this system. This is the situation with which your directors were confronted until comparatively recently. The situation has now been materially changed. Subsidiaries of companies of this system are now operating practically all bus lines out of White Plains, in the territory contiguous to our railway lines.

In Yonkers, of the fifteen bus lines for which the city authorities granted franchises, five did not compete with the lines of the Yonkers Railway, and were not contested. The remaining ten lines were contested before the Public Service Commission when the owners of the franchises came before that body for a certificate of convenience and necessity. The commission granted certificates of convenience and necessity for only two of the ten lines. It is not believed that the lines upon which the certificates of convenience and necessity were granted can be made to sustain themselves. The railway system is left for the most part free to serve the territory for which it was built.

In the Bronx, a franchise for all of the proposed bus lines was granted to the Surface Transportation Corporation of New York, one of the companies of the Third Avenue Railway. These bus lines in the Bronx to a very large extent open up new territory, feeding subway lines and the surface car lines of this system. They should, therefore, when operated in conjunction with our street railway lines, supplement rather than compete with the electric car lines in the Bronx. This bus operation in the Bronx will involve the purchase of about 100 buses. This purchase has been financed on 5 per cent equipment certificates.

Situation Clarified for Third Avenue Company

In Manhattan the plans for bus operation were modified and franchises granted only for crosstown lines. These do not offer any serious competition with the electric lines of this system.

From this it will be seen that the bus situation as affecting the companies of the Third Avenue Railway System has been very much clarified and the outlook for the growth of the companies of the system is better than it has been at any time since buses have become a menace throughout the country to electric railway growth.

CONSOLIDATED STATEMENT OF INCOME OF THIRD AVENUE RAILWAY AND CONTROLLED COMPANIES

Years Ended June 30

	1927	1926
Operating Revenue:		
Transportation	$14,858,299	$14,222,084
Advertising	150,000	150,000
Rent of tracks and terminals	23,448	24,399
Rent of buildings and other property	230,633	208,102
Rent of equipment	58,482	50,152
Sale of power	11,686	12,259
Total operating revenue	$15,332,549	$14,666,998
Operating Expenses:		
Maintenance of way and structures	$2,085,564	$2,256,726
Maintenance of equipment	1,416,736	1,699,862
Depreciation accruals	210,305	*399,753
Power supply	928,374	917,503
Operation of cars	5,029,683	4,872,190
Injuries to persons and property—Expended	1,183,028	1,174,784
Injuries to persons and property—Reserved	.....	*31,903
General and miscellaneous expenses	640,453	613,108
Total operating expenses	$11,494,146	$11,102,519
Net operating revenue	$3,838,402	$3,564,478
Taxes	988,460	1,036,624
Operating income	2,849,942	2,527,854
Interest revenue	222,713	197,434
Gross income	$3,072,655	$2,725,288
Deductions from Gross Income:		
Interest on first mortgage bonds	$513,080	$513,080
Interest on first refunding mortgage bonds	879,620	879,620
Interest onadjustment mortgage bonds	1,126,800	1,126,800
Track and terminal privileges	19,041	18,942
Miscellaneous rent deductions	8,747	8,499
Amortization of debt discount and expense	24,298	22,451
Amortization of limited franchises	8,270	7,469
Sinking fund accruals	33,480	33,480
Bus operation—net loss	34,153	16,783
Miscellaneous	148,347	60,268
Total deductions	$2,795,840	$2,687,395
Net income	$276,815	37,893

* Deficit.

We still have with us, however, the unjust paving tax, which has been removed to a very large extent in many states, but which has not been repealed in New York State. Its exactions bear heavily upon all street railroads. In the case of the companies of the Third Avenue Railway System, it amounts to more than $750,000 a year. This law is a relic of horse car days. But now it has become an unjust tax, and it is hoped that holders of electric railway securities everywhere will bring the injustice of this law to the attention of our legislators, with the hope that we may be relieved of this unfair burden.

Additional Defendants in Indiana Receivership Case

Trustees for the bondholders under various mortgages executed by the Union Traction Company of Indiana, Anderson, Ind., have been made additional defendants in the receivership case of the company in the Madison Circuit Court. A petition to that effect has been filed by the Westinghouse Electric & Manufacturing Company, plaintiff in the receivership suit. The amended complaint will bring into court all defendants having claims to determine preference among creditors. Carl F. Morrow, judge of the court, fixed Dec. 10 for a hearing.

Another Merger Plan

Sugggestion made that District of Columbia lines be combined in $52,700,000 concern with 7 per cent return

HARLEY P. WILSON on Oct. 31 officially submitted to the Public Utilities Commission of the District of Columbia his plan for a merger of local transportation systems, proposing organization under congressional charter of a new corporation to take over the railway properties of the Washington Railway & Electric Company and all the properties of the Capital Traction Company and the Washington Rapid Transit Company. John W. Childress, chairman of the commission, said:

The statement of Mr. Wilson's plan has been materially changed since it first was handed to me. This is a much less definite statement than the one first submitted. It will not be possible to hold public hearings on it until many more details have been supplied and definite proposals are advanced for discussion.

John H. Hanna, president of the Capital Traction Company, said he had discussed the plan with Mr. Wilson, but that he was not prepared to talk about the matter for publication. William F. Ham, president of the Washington Railway & Electric Company, was absent from the city.

The plan was outlined in a communication signed by Mr. Wilson and addressed to Mr. Childress. Outstanding among the features more or less fully set forth were the following:

Capitalization of the two railways is to be reduced by agreement from an estimated $62,500,000 to $50,000,000, which sum represents approximately, although not so stated in the Wilson letter, the outstanding stocks and bonds of the two concerns.

Added to this capital there is to be $1,700,000 in cash put in by the new company with which to finance relocation of some tracks and other betterments and $1,000,000, also in cash, for a car-fare adjustment fund. Thus the capitalization at which the merger will be started is to total $52,700,000, on which 7 per cent will have to be earned to constitute a reasonable rate of return.

Whereas the two railways and the bus company together earned less than $2,000,000 last year, they are to be guaranteed fares that will earn them $3,689,000 a year. Mr. Wilson expressed the opinion that this 85 per cent increase of net revenue would not necessitate an increase of fares. He suggests that there be no deviation from present fares during the first year of the unified operation.

The Public Utilities Commission is to have no jurisdiction over the new company or over any railway or local bus operation after the merger. Regulation is to be by three trustees paid by the company out of operating income and appointed by the District Commissioners.

The Potomac Electric Power Company is to be omitted from the merger, but is to enter a long-term contract to furnish power and lease certain equipment to the new company at rates less than present cost to the two railways.

Respective valuations of the properties are not to be used as the basis of division of profit. This basis is to be the respective earnings of the two companies for a typical year to be agreed upon. This basis would

give the Capital Traction Company slightly more than half the profits, whereas Mr. Wilson's estimate of valuations places the Washington Railway & Electric Company's worth at about $10,000,000 more than that of Capital Traction Company, as determined and to be determined by the courts.

No details are stated as to how stock of the new company shall be traded for stock of the present companies, or how the separation of the Potomac Electric Power Company from the Washington Electric & Railway Company is to be effected. But it is stated that the new company shall assume the funded debts of the two old companies.

The $1,000,000 fare adjustment cash fund is to be used to make up annual deficits, if any, in revenue, to be reimbursed later from subsequent earnings. Not only is the fund to be charged against capital account at the beginning, but all sums paid into it to replace withdrawals are also to be charged to capital account.

There is a suggestion in the Wilson letter that, under certain circumstances, deficiencies in earnings shall be "advanced temporarily by the city."

One Cent Out of Ten for Taxes

Economist of American Electric Railway Association makes forceful case for tax reduction before ways and means committee in Washington

ADDING to the testimony of numerous other representatives of business and industry in behalf of tax reduction, particularly a cut in the corporation income tax rate, before the ways and means committee in Washington on Nov. 1, Carl D. Jackson, general counsel of the National Electric Light Association and the American Gas Association, and Leslie Vickers, economist of the American Electric Railway Association, told the committeemen that lower taxes would benefit public utilities.

A tax reduction would be reflected ultimately in rates to the consumers, Mr. Jackson said, as regulatory bodies take taxes into account, the utilities acting more in the nature of collecting agencies for taxes paid by the consumers. A reduction in rates due to lowered taxes would mean more consumers and thus directly help the utilities, he asserted.

Mr. Vickers said that electric railways pay, in all forms of taxation, one and three-fourths as much as they distribute to their stockholders in dividends. Tax relief would make it possible for many of the electric roads to be revivified and to render better service. He said in part:

We are bearing a burden of taxation which is staggering in its weight. Its effect is not only to hamper us financially and to discourage the investment of new capital, but to impair those services which the public has a right to expect from us. Many of the electric railways of today could be revivified and restored if we could find relief from the oppressive burden of taxes which we bear. We ask for tax relief in the interests of service.

The taxes of the federal and local governments, including special assessments, but not such items as paving, comprise an estimated total of $65,000,000. The revenue of the industry for service it renders the public is approximately $936,000,000, so that for every dollar obtained as revenue 7 cents is contributed to government in the form of taxes. In addition to this we pay out a further 2 to 3 per cent of our gross revenue in paving and other charges, making a payment of approximately 10 per cent of our gross or a contribution to the state and federal governments of about 1 cent out of every 10 cents we collect. The tax item itself amounts to about half of all interest payments and is more than one and three-quarter times the amount paid out in dividends on preferred and common shares. The effect of such a substantial tax burden is to render more difficult the supply of public service and to affect profoundly the credit position of the industry.

In any industry, subject to regulation and operating under limited and reasonable rates, the burden of taxation in the last analysis rests upon the public utilizing that service. But there is a practical limit to the extent to which the public service company can act as collecting agent. A limit such as this is reached when cash requirements for taxes regularly assume so large a proportion of the net income of the corporation. Electric railways are local in character and scope of operation and accordingly relatively large taxes are already imposed by local governments. The federal income tax is a load added to an already overburdened industry and constitutes one of the most important examples of the adverse effect of the federal corporation tax on business development.

Our industry has passed through a revolution of the most serious nature. The present popularity of the private automobile could not have been predicted a generation ago, nor could have any one have suspected that the monopoly of urban transportation which we enjoyed could so easily be lost to us. But the fact is that today we are competing with private automobiles, not only for passengers, but for street space in which to operate.

Our industry is now emerging from a period as difficult as any industry has ever experienced. The essential nature of our services has been proved in community after community where attempts have been made to supplant them. We need tax relief, not only that we may supply the services now called for, but in order that we may continue to be in the future, as we have been in the past, the providers of efficient local transportation which builds up cities.

Goshen Abandonment Hearing Held

Harvey Harman of the Public Service Commission of Indiana held a public hearing recently on the Chicago, South Bend & Northern Indiana Railway's petition to discontinue city service in Goshen. Evidence taken in the hearing will be considered by the board and a final decision given later. Attorneys for both sides were given fourteen days in which to file additional evidence. The city protested the removal of the cars. R. R. Smith, receiver for the company, testified that it would cost $150,000 to place the line in first-class condition.

Traffic, Fare and Wage Figures

Further decrease is noted in the number of passengers carried by electric railways during the month of September, 1927, compared with September, 1926. The number of revenue passengers, including bus passengers, reported by 198 companies for the month of September, 1927, compared with September, 1926, is as follows:

September, 1927	739,275,475
September, 1926	754,012,025
Decrease, per cent	1.96

Owing to the fact that a new and completely revised Fare Bulletin, issued Oct. 1, showed that there were several changes from the cash fares as reported in former supplements of the old Fare Bulletin, compiled in September, 1925, the trend of cash fares in 272 cities of 25,000 population and over shown each month from Dec. 31, 1917, to date, has been slightly adjusted beginning with Nov. 1, 1921. On the new and revised basis the average cash fare in cities of 25,000 population and over is reported as follows:

Oct. 1, 1927	7.9700
Sept. 1, 1927	7.9700
Oct. 1, 1926	7.7387

The average maximum hourly rates paid motormen and conductors in two-man service by companies operating 100 or more miles of single track:

	Average Hourly Rate, Cents	Index Number 1913—100 Per Cent
Oct. 1, 1927	57.26	210.13
Sept. 1, 1927	57.26	210.13
Oct. 1, 1926	56.87	208.70

Morris Traction Company Sold for $290,000

The properties of the Morris County Traction Company, Morristown, N. J., was sold on Oct. 31 at receivers' sale to George Hamm, of Pittsburgh, Pa., representing the bondholders' committee, for $290,000. Immediately after the sale it was announced that the property would be assigned to the Public Service Transportation Company, subsidiary of the Public Service Railway, which would replace the electric railway cars with buses.

Of the $290,000 paid, $280,000 was for property in Morris County and $10,000 in Union County. The sales were conducted in Morristown and Elizabeth by former Judge John F. Lynch, as special master in chancery.

The bondholders' interest in the company amounted to about $3,900,000, and organization of the committee, which represented 88 per cent of the holders,

was for the purpose of salvaging as much as possible in the interest of the holders of the Morris County Traction Company's mortgage obligations.

The sales are subject to the approval of Federal courts.

Dismantling Schomberg & Aurora Line Planned

The Toronto Transportation Commission plans to dismantle the track and structures of the Schomberg & Aurora Railway, operation of which was discontinued on June 20, 1927. The Schomberg radial line ran a distance of 14.4 miles through country somewhat poor. It was the claim of the commission that the Schomberg radial was a losing proposition.

Coal Belt Electric to Be Acquired by Missouri Pacific

The Interstate Commerce Commission has authorized the Missouri Pacific to acquire the Coal Belt Electric Company, which operates an interurban electric line between Marion and Hafer, Ill., a distance of 13.46 miles. The interurban line has termini at Carterville, Herrin and Marion, Ill., and connects with the Missouri Pacific Railroad near Marion

The Missouri Pacific owns the outstanding stock of the interurban line and no new securities are to be issued in connection with the deal. In consideration for the conveyance of the property the Missouri Pacific Railroad has pledged itself to assume all unliquidated obligations of the Coal Belt Electric Company.

Legal Notes

CALIFORNIA—*Great Care Must Be Used in Operating a Car Without Lights at Night.*

An interurban car whose trolley had left the wire at night collided with an automobile. The court held that "such timely warning of the approach of a street car must be given as to enable others to avoid any danger from it," and neglect to give such warning, as by the absence of lights, was not the exercise of due care. In the same decision, the operation of the automobile of the plaintiff, while it was curtained at the side with isinglass rain covered curtains, was held not to be contributory negligence. [Cochran vs. Brown et al., 258 P., 1000.]

FEDERAL DISTRICT COURT—*To Be Engaged in "Interstate Commerce" Vehicles Must Regularly Transport Passengers or Goods Interstate.*

A company operated buses between two cities in Rhode Island but on part of the route ran for a short distance in Massachusetts and carried occasional interstate passengers. This was claimed to make the carrier interstate and so not under the jurisdiction of the Rhode Island authorities. The court held that an "interstate carrier" must run vehicles which transport passengers or goods interstate or honestly intend to do so. An occasional interstate passenger does not change the status. [Intercity Coach Co. vs. Atwood, 21 F. (2d), 83.]

MINNESOTA — *Paving Requirements Limited Under Franchise.*

A franchise secured in 1881 declared in one section that the company, if using other than animal power, should be required to pay only so much of the expense of street paving as was made extra by reason of the presence of its tracks on the street. Another section of the franchise declared that the company should keep the paving between its rails in proper repair. These sections were construed to mean that when new paving was laid the company could be charged only with the extra cost resulting from the presence of its track and that "proper repair" did not mean repaving. It meant only the restoration of existing paving to a sound or good state after decay, injury, dilapidation or partial destruction. [City of Duluth vs. Duluth Street Railway, 215 N. W., 69.]

MISSOURI—*Care Required When Car Operates on Left-Hand Track.*

An electric car was running for a short distance on the left hand track because of a traffic emergency and ran into an automobile whose driver was attempting to make a left hand turn. The plaintiff admitted he saw the car but believing it going in the other direction did not observe it as closely as he otherwise would have done. He was held not guilty of contributory negligence as a matter of law. [Wheaton vs. Wells, 296 S. W., 1031.]

NEW MEXICO—*Collection of Cost of Street Paving Made First Lien on Railway Property.*

A railway whose franchise required it to do a certain amount of paving issued mortgage bonds which were a first lien on the property. Some years subsequently the State Legislature passed an act making city assessments for paving superior to any other lien on street railways, except state, county and municipal taxes. The application of this act to the railroad in question was upheld. [City of Albuquerque vs. City Electric Co., 258 P., 574.

OHIO — *Instructions on Speed Considered.*

In a case charging negligence, where a municipal ordinance prohibited a greater speed than 15 miles an hour for a street car, it was error for the Trial Court to refuse an instruction that such a speed was in violation of the ordinance where the ordinance was valid even though under the law of Michigan the violation of a city ordinance as to speed is not negligence *per se.* Another requested instruction that the driver of a motor truck, unless he has actual knowledge to the contrary, has a right to assume that the electric car would be moving not more than 15 miles per hour as required by ordinance, was held properly refused as ignoring the principle of ordinary care by the driver in ascertaining the speed of the street car. [Liberty Highway Co. et al. vs. Callahan, et al., 157 N.E., 708.]

OKLAHOMA—*Definition of "Convenience and Necessity."*

Necessity does not mean indispensably requisite, when used in the expression "certificate of convenience and necessity." It means a public need, something without which the public is inconvenienced to the extent of being handicapped in the pursuit of business or wholesome pleasure or both—without which the people generally of the community are denied, to their detriment, that which is enjoyed by other people generally, similarly situated. [Chicago, R. I. & P. Ry. vs. State, 258 P., 874.]

TEXAS—*Compromise of Suit by Minor Upheld.*

Compromise of the settlement of a suit by a "next friend," in which the rights of minors are involved, should be scrutinized with great care and caution by trial courts, but where this has been done and the adjustment is fair and just to the minor and to his best interests, the compromise will be upheld. [Hernandez vs. San Antonio P. S. Co., 297 S. W., 264.]

TEXAS — *Negligence of Automobile Driver Defense to Suit for Injury to Automobile Guest where Driver has Interest in Action.*

Under the Texas law, property acquired by either husband or wife, except that which is the separate property of either, shall be deemed common property of both. This was held to prevent a wife from collecting damages because of the collision of an interurban car with an automobile in which she was a guest and her husband was the driver, where contributory negligence was charged against the driver. Alleged violation by the company of certain franchise conditions, where they had nothing to do with the accident, conferred upon the plaintiff no right to sue for breach of contract. [Northern Texas T. Co. vs. Hill et al., 297 S. W., 778.]

WASHINGTON—*Rights of Pedestrian in Front of Car at Street Crossing.*

A pedestrian crossing in front of a street car, standing at a regular stopping place, has a right to assume that the car will not start until he has passed or warning has been given. Hence he was not contributarily negligent when struck by the car.—[Whiting vs. City of Seattle, 258 P., 824.]

Personal Items

Messrs. Blackhall and Heun in New Posts

Former Joliet official assumes new duties with North Shore, while Joliet man succeeds to managership there

J. R. BLACKHALL, veteran electric railroad executive of wide experience, has assumed his duties as general manager of the Chicago, North Shore & Milwaukee Railroad, the North Shore Line. As noted previously in the ELECTRIC RAILWAY JOURNAL, he succeeds John F. Egolf, who resigned to become vice-president and general manager of the Western United Gas & Electric Company, with headquarters at Joliet, Ill.

At the time of his new appointment Mr. Blackhall was serving as vice-president and general manager of the Chicago & Joliet Electric Railway, with headquarters in Joliet. His offices with the North Shore Line are at Highwood, Ill.

Mr. Blackhall went to Joliet to manage the city lines in 1900, rebuilding the system and constructing the Chicago & Joliet interurban line. In 1901 he left Joliet for New Jersey, but continued supervision of construction work on the Joliet lines. He returned to Joliet in 1904 to become general manager of the electric lines, and in 1925 he was also named vice-president.

Recognized as one of the leading authorities on electric railroad operation, Mr. Blackhall has made outstanding contributions to advancement of the industry. He is the inventor of a new type of truck for street cars, which is practically noiseless, and also has developed an aluminum body for street cars, which reduces the average weight of the car per passenger almost one-half. The so-called "Joliet" car with this new aluminum body was exhibited at the 1927 national convention of the American Electric Railway Association at Cleveland, Ohio.

William H. Heun, associated with the electric railway system in Joliet, Ill., for many years, has been appointed general manager of the Chicago & Joliet Electric Railway. In this capacity he succeeds Mr. Blackhall, appointed general manager of the North Shore System in Chicago, but who will continue as vice-president of the Chicago & Joliet Electric Railway.

The new general manager has served as superintendent of transportation of the Joliet system for the last 23 years. He went to Joliet in 1892, after working at the printers' trade in Aurora and Chicago for about eight years. In search of health, he took the position of conductor on the local railway system. Soon he was called into the office and was made timekeeper and assistant cashier. Later he was made cashier and in 1904 was appointed superintendent of transportation.

His record in the latter capacity has been an excellent one. It is his intention to keep the Blackhall policies in force and to maintain the watchword of "service to the public" and "prevention of accidents."

G. A. LeRiche Superintendent of Transportation

After serving for some time as assistant to the general manager of the Chicago & Joliet Electric Railway, George A. LeRiche was appointed superintendent of transportation on Oct. 15 to succeed W. H. Heun.

Mr. LeRiche is a native of Canada, going to Joliet in 1912 from New Brunswick. His first work with the railway was in the electric line department. In 1919, after serving in the army for ten months, Mr. LeRiche was made storekeeper and when the Chicago & Joliet Transportation Company, a subsidiary of the railway, erected its modern bus garage in 1926 he was named superintendent of automotive equipment, later being called into the general office as assistant to Mr. Blackhall, then general manager of the combined properties being operated out of Joliet.



J. R. Blackhall



W. H. Heun

Howard C. Venn is serving as industrial agent of the Interstate Public Service Company, Indianapolis, Ind. He succeeds W. Gerald Holmes, who has been transferred to the National Electric Power Company of New York. For a number of years Mr. Venn was connected with the Spann Company, one of the largest real estate firms of the city. He resigned from this company in 1913 to enter the real estate business for himself. As a member of the Indianapolis Real Estate Board he was at various times a member of the board of directors, treasurer and served on a number of appraisal committees of the board.

Messrs. Hardesty, Martin and Spofford Advanced in West Virginia

C. H. Hardesty, who has been manager of the Parkersburg and Marietta divisions of the Monongahela West Penn Public Service Company in West Virginia, was appointed assistant to the president of the company under a new plan of organization announced by President G. M. Alexander. He will be succeeded at Parkersburg by W. M. Martin of Fairmont, who has been superintendent of the power department district which includes the cities of Weirton, Wellsburg, Oakland, Terra Alta, Kingwood, Elkins and Parsons.

Under the new organization, additional responsibility is given R. W. Spofford, who takes over general charge of all railways and bus operations. Mr. Spofford has had charge of the railways on what is generally known as the Fairmont and Clarksburg division and the bus lines in this section, but in the future he will have charge of the transportation also in the Parkersburg and Marietta section.

Mr. Hardesty, who started with the Monongahela company in 1917 in the purchasing department, after some years in the employ of the Western Maryland Railway, was born at Wyatt, in Harrison County. He is well known in the local section. In 1919 he was appointed traveling freight and passenger agent, later being transferred to Clarksburg as division superintendent. He returned to Fairmont and served as general freight agent and then general traffic manager of all divisions until April 6, 1925, when he was transferred to the Parkersburg and Marietta division as manager. Mr. Hardesty will be located in Fairmont, and will not take over his new duties actively until after the annual convention of the State Utility Association.

Mr. Martin, who went with the local company about two years ago from the West Penn system, had charge of light and power at Grafton until he was appointed superintendent of the larger district. He has been a resident of Fairmont for some time and is well and favorably known there. Mr. Martin has already taken over his new duties in Parkersburg.

J. B. O'Connell is serving as superintendent of the North Avenue depot of the Chicago Surface Lines, Chicago, Ill. He has been at various times with the Surface Lines and the Pennsylvania Railroad since his graduation from the University of Illinois, class of 1923. He was enrolled in the university at the outbreak of the World War, but left to enlist in the United States Navy, where he was soon made a chief electrician. Returning to the university after the war he finished his course in railway electrical engineering.

English Visitors Return Home

The representatives of the London Underground Railway and General Omnibus Companies who have been visiting this country returned to England on Nov. 2. They sailed from New York on the *Berengaria*. On the evening of Nov. 1 B. A. Hegeman, Jr., representative in the United States of the Underground Railway group, was host at a farewell dinner to the visitors. It was held at the Lotos Club. Some 30 railway officials and others from New York and vicinity were present.

The accompanying snapshot of the English visitors was made at the Cleveland convention. Left to right they are:



Officials of the London Underground Group who returned to England on Wednesday

J. P. Thomas, operating manager of railways; Owen Watson, research engineer London General Omnibus Company; W. S. Every, signal engineer of the Underground, and R. H. Pitts, staff officer of the Underground.

H. E. Dittmar and H. Bongard in New Posts in Brooklyn

Harry E. Dittmar has been appointed division superintendent at the 9th Avenue depot of the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., to succeed the late Charles B. Attlesey.

Herman Bongard will succeed Mr. Dittmar as division superintendent at DeKalb Avenue depot.

Mr. Dittmar began his railroad career on the Brooklyn Transit System in 1905, having been employed previously in the Schenectady shops of the General Electric Company. In his fifteen years he advanced from the rank of motorman to assistant superintendent in charge of Maspeth depot.

Mr. Bongard goes to DeKalb Avenue depot with many years of experience as division superintendent at Bergen Street depot. He began his railroad career as a towboy for the Brooklyn City Railroad in 1887 and in 1889 was appointed a conductor at the old Greenwood depot of the Brooklyn-Manhattan Transit Corporation. Early this year, due to ill health, he was transferred to the staff of the accident prevention bureau.

Powell C. Groner Made President at Kansas City

Voting trustees representing the stockholders of the Kansas City Public Service Company, Kansas City, Mo., unanimously elected these directors on Nov. 3: E. M. Stayton, Henry Hanssen, P. W. Goebel, Herbert M. Woold, Powell C. Groner, Charles M. Howell, Henry N. Ess, James E. Chandler, Carl W. Allendoerfer, J. K. Newman, P. H. Saunders. The five trustees are: J. K. Newman, William Woolfolk, George W. Davison, Powell C. Groner and Walter S. McLucas. Mr. McLucas, who is chairman of the board of the Commerce Trust Company, Kansas City, replaces M. A. Traylor, who resigned two weeks ago.

The directors at their meeting the same day elected these officers: P. W. Goebel, chairman of the board; Powell C. Groner, president; John V. McKinney, vice-president; Fred. G. Buffe, vice-president in charge of operations; Neal S. Doran, comptroller; J. A. Harder, secretary and treasurer; L. M. Boschert and W. S. Walker, assistant secretary and assistant treasurer; H. F. Haynes, assistant secretary. Mr. Woolfolk declined to accept election to the position of the chairman of the board or as a director. There will be no change in the company policy and the improvement program to the physical property started by Woolfolk & Company will be completed in the next two years.

J. N. Shannahan Mentioned for Omaha Post

According to Omaha newspapers, J. N. Shannahan, former president of the Newport News & Hampton Railway, Gas & Electric Company, Newport News, Va., is being considered for election to the presidency of the Omaha & Council Bluffs Street Railway, Omaha, Neb. If he were chosen Mr. Shannahan would succeed in that post Fred Hamilton, long a banker but a man who because of his other affiliations finds it impossible to give to the duties of his position with the railway the time and attention they rightfully deserve.

When he was asked about the matter in New York on Nov. 4 Mr. Shannahan said that it was true negotiations were in progress for his going to Omaha in the capacity of president, but that nothing definite had been determined.

Christian J. Laurisch, an attorney of Mankato, has been appointed a member of the Minnesota Railroad and Warehouse Commission by Governor Theodore Christenson effective on Jan. 1, 1928, upon the resignation of Ivan Bowen.

OBITUARY

David Williams

David Williams, former president of the David Williams Company, publishers of the *Iron Age*, died on Oct. 28. He was 85 years old. Mr. Williams was born in Waterford, Ireland, but came to this country with his father, John Williams, when only nine years old. After his graduation from Middletown Academy in 1857, he associated himself with his father in the publishing of the *Iron Age*, which John Williams had established two years before. Eleven years later David Williams assumed control of the periodical.

Mr. Williams retired from the presidency of the David Williams Company in 1909. He had been president of the American Trade Press Association and also of the Federation of Trade Press Associations in the United States.

H. Gordon Gilpin, former general manager of the Ohio Electric Railway, Springfield, Ohio, before it became segregated into various smaller units, died recently. In that position, he succeeded A. Benham. Mr. Gilpin had served as assistant general manager, with office at Lima, for six years. Previous to that he was connected with the operating department of the Cincinnati Traction Company, part of the time as assistant superintendent. He was also associated with the late W. Kesley Schoepf for about ten years, serving under him in Washington, D. C. Prior to his connection with the Cincinnati Traction Company Mr. Gilpin had been identified with the Mill Creek Valley Electric Railway.

Manufactures *and the* Markets

$600,000 for Minneapolis Extension

Extensions by the Minneapolis Street Railway, Minneapolis, Minn., submitted to the City Council for 1928 will cost $600,000. Among them are extensions of the Chicago Avenue line from 48th to 54th Street, into Richfield, which was recently annexed to the city; Bloomington Avenue, France Avenue, Monroe Street, northwest terminal lines as may be determined and the double tracking of the West Broadway line to the city limits. Much preliminary grading will be required on some lines. Other expenditures will be for paving between tracks, replacing rails and other work.

Virginia Electric & Power Extending Belmont Avenue Line

Work has been started on a $63,000 extension to the Belmont Avenue street car line of the Virginia Electric & Power Company, Richmond, Va., to take care of the transportation requirements of the west end territory lying west of Byrd Park. The extension will be completed by Jan. 1. Plans call for the laying of 4,200 ft. of double track. F. Carter Womack, the company's engineer in charge of maintenance of way, will direct the work.

London Subways to Spend $12,500,000 on Equipment

The London Underground Electric Railways has just announced a program costing $12,500,000 for improvements. This sum will be spent during the next two years in the purchase of new cars and equipment for its underground lines. The step is in the interest of economy of operation.

Passengers to Decide Type of Car Seat for Interurban

Citizens of Dallas, Tex., and vicinity will have an opportunity to let the Texas Electric Railway know what type of car seat they prefer for interurban use.

The Texas Electric Railway, operating interurban lines from Dallas to Denison, Dallas to Waco and Dallas to Corsicana, is said to plan to go to its patrons to obtain this information. James P. Griffin, vice-president in charge of operation, examined different types of interurban seats now being manufactured and has fitted up a car with several of them.

In anticipation of the plan being put into operation, Mr. Fewell, general passenger agent, is reported to have said:

We did not want to decide which type is best without taking our patrons' wishes into consideration. So we hit upon the plan of equipping our car No. 325 with all of these different sample seats and running it up and down the line.

In this car there are six different types of the latest developments in interurban seats. We are asking our friends who travel with us to try out these seats, which are all numbered plainly. The conductor on No. 325 has some cards with spaces for you to use in telling us the number of the seat the riders like best.

There is also space for remarks as to the seating arrangement, spacing, and so on, which might make our service more comfortable.

In continuing, he suggests to the public that ride car No. 325 to "be sure to get a card, fill it in and return it to the conductor."

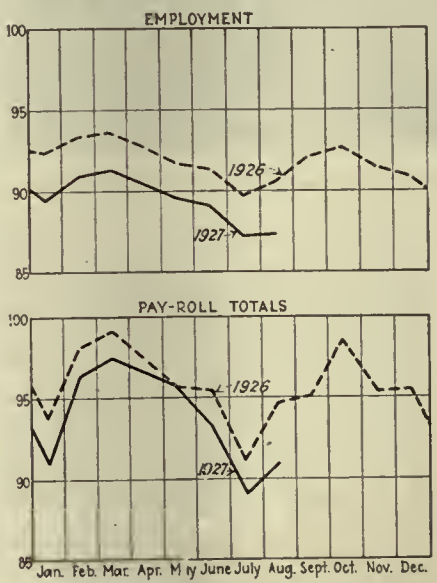
Twelve Cars to Be Ordered for Knoxville

An order for twelve new cars will be placed immediately by the Knoxville Power & Light Company, according to a recent announcement by Col. C. H. Harvey, president of the company, it is reported. The cars will cost approximately $150,000. They are intended for operation on the Lonsdale, Lincoln Park and Fountain City lines.

Employment in Manufacturing Industries Showed Upward Trend in August

One-tenth of 1 per cent increase in August, 1927, as compared with July. Data on car building and electric railroads employment given

EMPLOYMENT in the manufacturing industries increased one-tenth of 1 per cent in August as compared with July and payrolls increased 2.1 per cent, according to the last labor report of the bureau of statistics of the United States Department of Labor. "The easing off of the vacation season and the completion of July inventory taking and repairs," says the report, "account in part for these increases, although a well-defined upward trend appeared in several industries. The level of employment in August, 1927, nevertheless, was 3.6 per cent lower than in August, 1926, and payroll totals were 3.8 per cent lower."



Employment and payroll charts from "Monthly Labor Review"

The bureau of labor statistics weighted index of employment for August, 1927, is reported as 87.4, as compared with 87.3 for July, 1927; 89.1 for June, 1927, and 90.7 for August, 1926; the weighted index of payroll totals for August, 1927, is 91.0, as compared with 89.1 for July, 1927; 93.3 for June, 1927, and 94.6 for August, 1926. The report for August, 1927, is based on returns made to the bureau of labor statistics by 10,918 establishments in 54 of the principal manufacturing industries. These establishments in August had 3,028,729 employees whose combined earnings in one week were $80,566,040. Thirty-two of the industries had more employees in August than in July and 40 industries reported increased payrolls. The iron and steel industry showed 1.2 per cent drop in employment, with an increase of 4.9 per cent in payroll totals. Car building and repairing electric railroads, based on reports from 383 establishments, showed the number on the pay-

Industry	United States, Cents	Geographic Division: New England, Cents	Middle Atlantic, Cents	East North Central, Cents	West North Central, Cents	South Atlantic, Cents	East South Central, Cents	West South Central, Cents	Mountain, Cents	Pacific, Cents
Electrical machinery, apparatus and supplies:										
Low	33.0	33.0	40.0	39.0	35.0	40.0	....	....	....	....
High	61.0	48.0	51.0	61.0	40.0	40.0	....	....	....	....
Average	44.2	42.8	41.6	49.2	37.5	40.0	....	....	....	....
Public utilities:*										
Low	20.0	40.0	32.0	32.5	30.0	20.0	25.0	27.0	35.0	33.0
High	71.5	71.5	63.0	60.0	40.0	45.0	40.0	35.0	40.0	56.3
Average	39.8	47.4	45.5	45.9	33.4	32.9	29.1	29.2	36.7	47.9

* Including street railways, gas works, waterworks, and electric power and light plants.

roll as of July, 1927, as 25,420, as compared with 25,543 for August. This was a per cent of change of +0.5. For July, 1927, there was a $768,549 payroll, as compared with $784,515 for August, 1927, a +2.1 per cent of change.

A comparison of the employment and payroll totals in August, 1927, against those of August, 1926, reveals that employment in manufacturing industries was 3.6 per cent lower in August, 1927, than in August, 1926, and that payroll totals were 3.8 per cent lower. The per cent of change in the car building and repairing for electric railroads for August, 1926, and August, 1927, respectively, shows as follows: +3.5 per cent and +2.2 per cent. Per capita earnings in the electrical machinery apparatus and supplies industry for August, 1927, as compared with the preceding month and August, 1926, are as follows: July, 1927, 3.9; August, 1926, 1.4. For the car building and repairing electric railroad industry the per cent of change for August, 1927, as compared with July, 1927, was +1.6, and in August, 1926 —1.3.

The car building and repairing electric railroads industry out of a total number of 383 establishments reporting from July 15 to August 15 shows one increase in wages affecting 65 employees. The electrical machinery apparatus and supply industry with 75 plants reporting shows one increase affecting nineteen employees. The percentages of increase in the wage rates were 16.7 per cent and 5.0 per cent respectively.

Turning to another section of the report, there is found some interesting data on entrance wage rates for common labor as of July 1, 1927. According to the report, the term "common labor" has many interpretations among different industries and even among different localities or plants in the same industry. Owing to these difficulties in the way of securing comparable data as to wage rates for common labor, the bureau of labor statistics has confined these statistics to entrance rates alone; that is, the data here presented are based on the rate of pay per hour given unskilled male adult common laborers when first hired.

The survey is limited to thirteen important industries which supplied the principal number of common laborers. Some establishments have reported two rates; for example, one for a ten-hour day and one for an eight-hour day, or one for white and one for colored or Mexican workers. Incidentally, the report shows that there were 15,989 common laborers employed by public utilities as of July 1, 1927. The weighted average entrance rates per hour of all industries covered, including general contracting, have been as follows:

July 1, 1926	42.8
Oct. 1, 1926	43.4
Jan. 1, 1927	43.2
July 1, 1927	42.6

Continuing, the report says: "Omitting the data for general contracting, which was first included in these compilations on July 1, 1926, average entrance rates per hour for the periods studied have been as follows:

	Cents
Jan. 1, 1926	40.2
April 1, 1926	40.5
July 1, 1926	40.9
Oct. 1, 1926	40.9
Jan. 1, 1927	41.0
July 1, 1927	40.4

The accompanying tables show for each industry the high, low and average entrance rates per hour in each geographic division and in the United States as a whole.

Shipment of Four Cars to Carolina Power & Light Completed

Shipment of the four special safety motor cars for the Carolina Power & Light Company, Raleigh, N. C., was recently completed. The order, placed with the J. G. Brill Company on July 16, was announced in the JOURNAL for Aug. 13.



Interior view of one of the four safety cars built for the Carolina Power & Light Company, Raleigh, N. C.

The cars are of the one-man, double-end, single-truck type with Brill 79-E-2 trucks. They are 32 ft. 10½ in. over all, weigh 14,000 lb. and have a seating capacity of 40.

The specifications as given by the Brill company are appended:

Number of units	4
Type of unit	One-man, motor, passenger, city, double end, single truck
Seating capacity	40
Builder of car body	J. G. Brill Co.
Date of order	July 16, 1927
Date of delivery	Sept. 27, 1927
Weights:	
Car body	11,940 lb.
Trucks	5,640 lb.
Equipment	4,586 lb.
Total	22,166 lb.
Length over all	32 ft. 10½ in.
Length over body posts	20 ft. 6½ in.
Truck wheel base	9 ft. 0 in.
Width over all	8 ft. 5 in.
Height, rail to trolley base	10 ft. 7½ in.
Window post spacing	29 in.
Body	All steel
Roof	Arch
Air brakes	Westinghouse
Armature bearings	Plain
Axles	A.S.T.M. spec. A-20-21 annealed
Car signal system	Faraday
Conduit	Flexible
Control	G.E. "K" double end
Couplers	Portable
Curtain material	Pantasote
Destination signs	Keystone
Doors	End, folding
Fare boxes	Cleveland, model 5
Finish	Paint
Floor covering	Painted
Gears and pinions	G.E. grade M
Glass	Double-thick American
Hand brakes	Brill vertical handle
Hand straps	Rico No. 2
Heaters	Gold single coil truss plank
Headlights	Golden Glow SM 95
Interior trim	Mahogany
Journal bearings	Plain
Lamp fixtures	G.E. 009
Motors	Four G.E.-265 A, 35 hp.
Painting scheme	Yellow
Roof material	Wood covered with canvas
Safety car devices	Safety Car Devices Co.
Seats	Brill 201
Seat spacing	29 in.
Seating material	Rattan
Slack adjusters	Brill air-operated
Steps	Folding
Step treads	Wood with Feralun
Trolley catchers	Ohio Brass
Trolley base	U. S. No. 3-E
Trucks	Brill 79-E-2
Ventilators	Brill exhaust
Wheels, type	27-in. rolled steel
Wheelguards	H.B.
Special devices	National Pneumatic door and interlocking switches

Copper Strong, Zinc Breaks

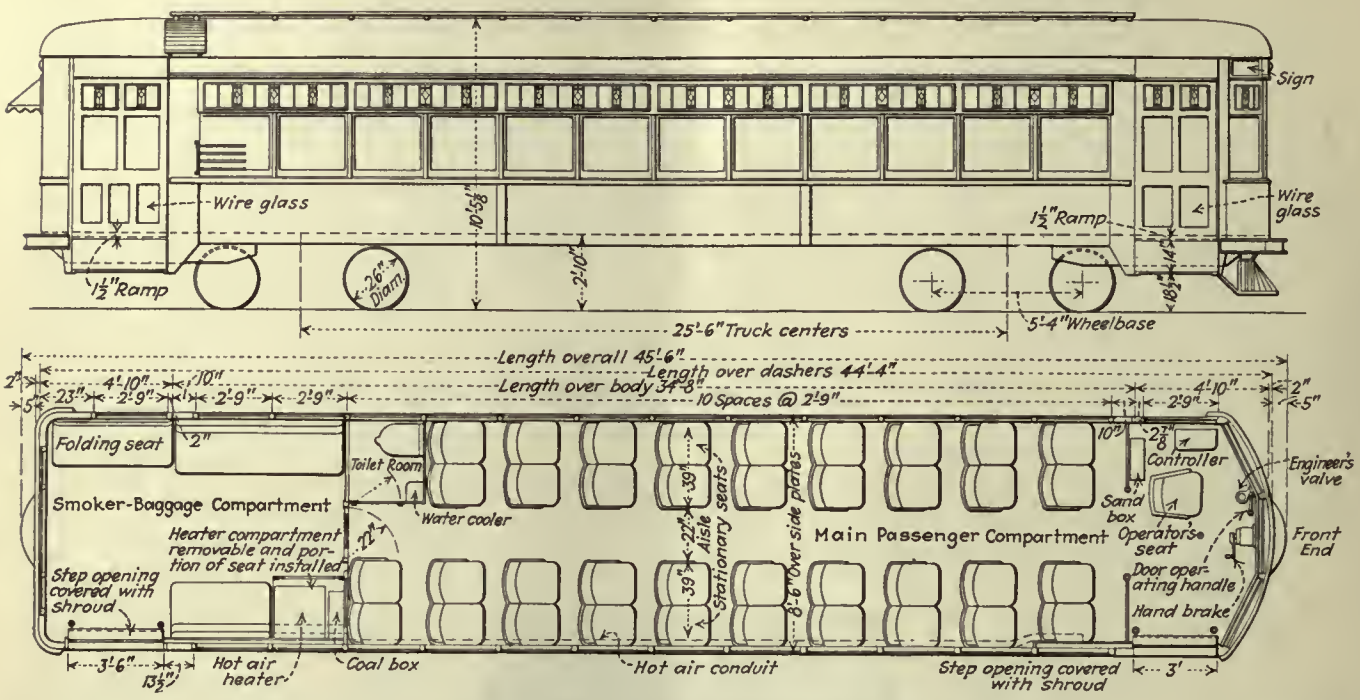
Sales of copper both in the United States and abroad have been better than was generally expected, with the result that the price situation is firmer than for weeks, with most sellers out of the market at their long-held quotation of 13¼ cents delivered Connecticut. Lead demand has improved somewhat, but the price is no better. Zinc has been the weak sister among the metals, last week's break below 6 cents, St. Louis, having continued, with the 5¾-cent level reached Nov. 1.

Most of the copper sold in the last week has been between 13.20 and 13.25 cents, delivered Valley, though one small lot went out as low as 13.175 cents. During the week a good tonnage was sold in the Middle West at slightly higher prices than would be represented by the usual ⅛ cent differential, bringing the f.o.b. refinery price average up to 13.025 cents. On Nov. 2 a good tonnage was sold at 13¼ cents delivered at usual



Four safety cars of this type for the Carolina Power & Light Company

Four Interurban Units Ordered by Kansas City, Leavenworth & Western



Following are specifications, seating plan and elevation for the four one-man, interurban, semi-steel cars ordered on July 20 for the Kansas City, Leavenworth & Western Railway, Kansas City, Kan. This order, which was placed with the American Car Company, St. Louis, was announced in ELECTRIC RAILWAY JOURNAL for Aug. 13. The cars will be painted in a color scheme of blue, ivory and red, the colors to be used on the roof, center, bottom and letter board respectively. Four GE-247 inside-hung motors will furnish the power and the bodies will be mounted on Brill 177-E-1 trucks. A spacious smoking compartment of observation car design will be one of the outstanding features of these cars.

Number of units	Four
Type of unit	One-man, motor, passenger, siogle end, double truck
Number of seats	47
Builder of car body	American Car Company, St. Louis, Mo.
Date of order	July 20
Length over all	45 ft. 6 in.
Length over body posts	34 ft. 8 in.
Truck wheelbase	5 ft. 4 in.
Width over all	8 ft. 8¾ in.
Height, rail to trolley base	10 ft. 8 in.
Window post spacing	33 in.
Body	Semi-steel
Roof	Arch
Air brakes	G. E. straight
Car signal system	Faraday
Compressors	CP-27
Conduit	Flexible
Control	K-75
Couplers	American Car Co.
Curtain fixtures	Curtain Supply Co.
Curtain material	Pantasote
Destination signs	Hunter
Door mechaniam	American Car Co.
Doors	End
Finish	Enamel
Floor covering	Rubber tiling
Gears and pinions	G. E.
Glass	D. S. A.
Hand brakes	Brill vertical
Heaters	Hot air
Headlights	G. E. luminous arc
Headlining	Agasote
Interior trim	Mahogany
Journal bearings	Plain
Lamp fixtures	American Car Co. indirect lighting
Motors	Four G. E.-247, inside hung
Painting scheme	Blue roof, ivory center, red bottom, and letter board
Roof material	T. & G. board
Sash fixtures	Schechter post casing
Seats	Brill bucket type
Seat spacing	33 in.
Seating material	Leather
Steps	Stationary
Step treads	Kass safety
Trolley catchers	Eclipse
Trolley base	Ohio Brass
Trolley wheels	Ohio Brass
Trucks	Brill 177-E-1
Ventilators	American Car Company
Wheels	26-in. rolled steel
Wheelguards	Steel pilot

Eastern points, but a general advance in quotations was made to 13⅜ cents, at which price some business was also booked. The foreign price was advanced to 13.70 cents Nov. 2, after an excellent week's business at 13.60 cents.

METAL, COAL AND MATERIAL PRICES
F. O. B. REFINERY

Metals—New York	Nov. 1, 1927
Copper, electrolytic, cents per lb	13.025
Copper wire, cents per lb	15 25
Lead, cents per lb	6.225
Zinc, cents per lb	5 787
Tin, Straits, cents per lb	57.50
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.10
Somerset mine run, Boston, net tons	1 825
Pittsburgh mine run, Pittsburgh, net tons	1.825
Franklin, Ill., screenings, Chicago, net tons	1.575
Central, Ill., screenings, Chicago, net tons	1.125
Kansas screenings, Kansas City, net tons	2.30
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$5.50
Weatherproof wire base, N.Y., cents per lb.	16.00
Cement, Chicago net prices, without bags	2.05
Linseed oil (5-bbl. lots), N. Y., cents per lb.	10.6
White lead in oil (100-lb. keg), N. Y., cents per lb	13.75
Turpentine (bbl. lots), N. Y., per gal	$0 58

A fair volume of buying at unchanged prices, for the most part, has characterized the lead markets during the week. The American Smelting & Refining Company continued to maintain its official price for the New York territory at 6.25 cents.

In the Middle West the leading interest, possibly encouraged by a slight upward tilt in the London market, quoted 6.025 cents and got it on several orders. However, the price was reduced the following day, and 6 cents was the prevailing price on Nov. 2.

The zinc market continues disappointing, both from the producing and consuming standpoints.

Spot lots of high-grade continue nominally at 7¾ cents. Prime Western in New York is at the customary differential of 35 cents per 100 lb. above St. Louis quotations.

With the bears apparently in the ascendency in the London tin market, and every one expected further declines, buyers in the domestic market naturally have confined their purchases to immediate requirements only. The price has sagged each day and with London cables off 27 s. 6 d. Nov. 2, spot Straits is available at 56⅞. December is about ⅛ and January about ¼ cent lower.

TRADE NOTES

WHITING CORPORATION, Harvey, Ill., announces the death of its vice-president and director of sales, Norman Spear Lawrence, Wednesday, Oct. 26, 1927, of pneumonia. Mr. Lawrence was born May 9, 1882, at Chicago, Ill., and was educated in the schools of Chicago. He was graduated from Cornell University in the class of '04 as a mechanical engineer, and shortly after entered the employ of the Whiting Corporation, Harvey, Ill., as an estimator, becoming successively chief estimator, assistant sales manager, vice-president and director of sales. During the past few years Mr. Lawrence was also president of the Swenson Evaporator Company, which is a subsidiary of the Whiting Corporation.

The biggest accident reserve fund in the country

What might have happened is an intangible quantity—difficult to pin down to a total of dollars and cents. Still you can gain an approximate idea by totaling the costs of accidents due to the failure of ordinary hand brakes to meet the emergency.

It is on this line of reasoning that railway officials the country over have long since come to regard Peacock Staffless Brakes as a huge accident reserve fund—a total beyond compilation because what might have happened never does when the motorman swings into timely action with his dependable Peacock Staffless Brake. A Peacock Staffless will not clog or jam no matter how much slack chain there is to take up.



The "Peacock" (Reg. U. S. Pat. Off.) Staffless



National Brake Company

890 Ellicott Square, Buffalo, N. Y.

Canadian Representative

Lyman Tube & Supply Co., Ltd., Montreal, Can.





No. 900-D
Double Stationary Chair
Without Armrest



No. 392-A
Walkover Seat with deep springedge divided cushion and divided concave springedge back.

Seats for modern city cars—

To provide city service that has rider appeal—service that can compete on an equal basis with other forms of transportation—is an ever perplexing problem for many railways.

Excellent examples of how Hale & Kilburn Seats have helped to solve this problem for two companies are—

The No. 900-D Chairs installed in the ten new Cincinnati, Hamilton & Dayton city cars.

The No. 392-A Seats installed in the fifty new cars for the Worcester (Mass.) Consolidated Railway.

If you are planning a new car or a rehabilitation program it will pay you to investigate the complete line of H & K Seats.

One of our representatives will be glad to consult with you at any time.

HALE & KILBURN COMPANY

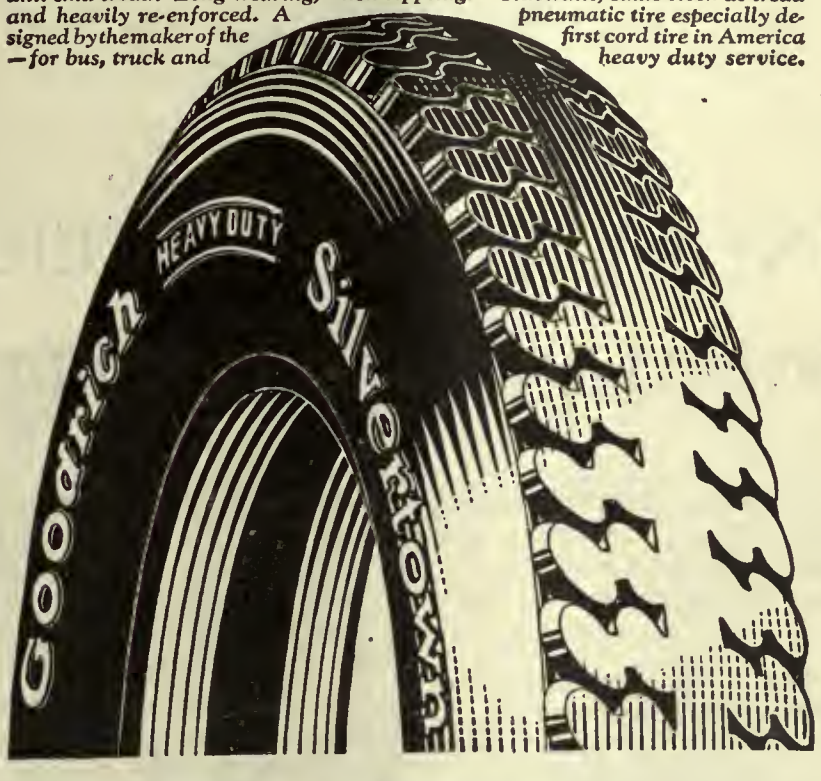
General Offices and Works: 1800 Lehigh Avenue, Philadelphia

SALES OFFICES:

Hale & Kilburn Co., 30 Church St., New York
Hale & Kilburn Co., McCormick Bldg., Chicago
E. A. Thornwell, Candler Bldg., Atlanta
Frank F. Bodler, 903 Monadnock Bldg., San Francisco
T. C. Coleman & Sons, Starks Bldg., Louisville
W. L. Jefferies, Jr., Mutual Bldg., Richmond
W. D. Jenkins, Praetorian Bldg., Dallas, Texas
H. M. Euler, 146 N. Sixth St., Portland, Oregon

Hale and Kilburn SEATS

Super dimensions—special rubber compound. Extra tough, heavy duty, anti-skid tread. Long-wearing, "non-rippling." Sidewalls, same stock as tread and heavily re-enforced. A pneumatic tire especially designed by the maker of the first cord tire in America —for bus, truck and heavy duty service.



Profit...from every point of design!

Every word in those five lines of small type above has a meaning in the profit of the users of Goodrich Heavy Duty Silvertowns.

It is because the design is right—the materials are right for every purpose—the tread is right—the whole tire is right—that leading fleet operators are making profits from Silvertowns—profits in savings of mileage costs, profits from elimination of delays, profits from increased patronage—good reputation for service, built by these tires.

THE B. F. GOODRICH RUBBER COMPANY, *Established 1870,* **Akron, Ohio**
In Canada: **Canadian Goodrich Company, Kitchener, Ontario**

Goodrich
HEAVY DUTY
Silvertowns
HIGH PRESSURE OR BALLOON



One INDUSTRIAL ADVERTISER *captured 40% of a rich market*

FIVE years ago an important industrial change appeared on the horizon. It meant a new market and new profits. At that time it was anybody's market, a new field for all, with no established leader.

A score of producers saw the opportunity, but one alert manufacturer nominated himself for the post of leadership. During the period when buyers were testing, comparing and experimenting with his and competing products, this manufacturer dominated buyers' thoughts by the forceful use of Industrial Advertising.

By so doing, this manufacturer "beat the gun" in the rush to the new field of profits. In 1926, after four years of Industrial Advertising, 46 per cent of all buyers in this particular field were his customers. His output constituted 40 per cent of all sales to this market last year. Over the four-year period, when competitors were fluctuating up and down in rank, strong Industrial Advertising kept this one manufacturer entrenched in the lead.

Industrial Advertising vs. "Using Space"

His competitors also advertised but this manufacturer continuously used the most effective space units of Industrial Advertising to win this new industry's recognition of his product. His advertising appropriation was large enough each year to carry on the leadership job originally mapped out. His copy reflected an intimate knowledge of the buyers' problems and talked their language. There was no stinting of effort in obtaining and presenting vital performance facts. Industrial advertising men combed the field for data before the advertising copy was prepared.

This advertising was published almost exclusively in two McGraw-Hill Publications that are recognized for the vital guidance and help they have given to the industry that constituted this manufacturer's market.

In this case the persistent use of liberal space was true economy and extremely effective. It not only hastened the industrial change and gained for the manufacturer that much-desired buyers' recognition, but it is now enabling him to hold the lead and advance to still greater sales volume.

Details Differ, But Not Fundamentals

Your industrial selling problem may differ in detail from the case cited. One set of circumstances demands dominant Industrial Advertising from the start; another situation may recommend a different program. The proper procedure in any case is more easily determined when the McGraw-Hill book, "Industrial Marketing at Work," is studied, and its basic principles applied. This book is based on a study of numerous cases in which the Four Principles of Industrial Marketing have been used.

If your markets lie within any field of industry broader than your strictly local territory, a McGraw-Hill representative will be glad to discuss this study and leave with you or your advertising agent a complimentary copy. Your request should be directed to the nearest McGraw-Hill office.



This advertisement is being published in the McGraw-Hill Publications, Printers Ink Monthly, Advertising and Selling, Class and Industrial Marketing, Finance and Industry, Standard Rate and Data Service, New York Times, New York Herald Tribune, Boston News Bureau and Chicago Journal of Commerce.

McGRAW-HILL PUBLISHING COMPANY, INC., NEW YORK, CHICAGO, PHILADELPHIA, CLEVELAND, ST. LOUIS, SAN FRANCISCO, LONDON. PUBLISHERS OF

McGRAW-HILL *Publications*

Electrical
ELECTRICAL WEST
ELECTRICAL WORLD
ELECTRICAL MERCHANDISING

Construction & Civil Engineering
ENGINEERING NEWS-RECORD
CONSTRUCTION METHODS

Industrial
POWER
AMERICAN MACHINIST
INDUSTRIAL ENGINEERING
CHEMICAL & METALLURGICAL ENGINEERING

Catalogs and Directories
McGRAW-HILL ELECTRICAL ENGINEERING CATALOG
McGRAW-HILL ELECTRICAL TRADE CATALOG McGRAW CENTRAL STATION DIRECTORY
KEYSTONE COAL MINING CATALOG McGRAW ELECTRIC RAILWAY DIRECTORY
KEYSTONE METAL QUARRY CATALOG METAL QUARRY DIRECTORY
KEYSTONE COAL BUYERS CATALOG COAL FIELD DIRECTORY
BONBRIGHT SURVEY OF ELECTRIC POWER & LIGHT COMPANIES IN THE U. S

Radio
RADIO RETAILING

Transportation
BUS TRANSPORTATION
ELECTRIC RAILWAY JOURNAL

Mining
COAL AGE
COAL AGE NEWS
ENGINEERING & MINING JOURNAL

Overseas
INGENIERIA INTERNACIONAL
AMERICAN MACHINIST
(EUROPEAN EDITION)

48,000 PAGES USED ANNUALLY BY 3,500 INDUSTRIAL ADVERTISERS TO HELP INDUSTRY BUY MORE INTELLIGENTLY

[Successful Bus Lines are profiting from the bus tire service developed by Firestone Dealers in cooperation with factory engineers]



Firestone Dealers

Can Save You Money and Serve You Better

Tire conservation—getting out of tires, all the mileage built into them at the factory—is an important part of the service of Firestone Dealers. They have modern repair equipment, especially designed by Firestone, to assure Bus Lines quick, uniformly dependable repair service.

Firestone Dealers are trained in the latest tire repair methods, at the Company's Repair Schools, conducted at the Factories and in principal Branch Cities throughout the United States. They are experts in rebuilding at low cost, tires that have been injured, protecting Firestone users from loss.

Firestone Dealers have also had the advantage of Tire Educational Meetings, where, by means of motion pictures, charts, tire samples and engineering data, they learned details of tire design and construction. This keeps them up-to-date on all matters of tire development—from the source best qualified to give it—Firestone.

The Firestone Dealer is in position to give you better service, for he receives Firestone Gum-Dipped Tires and Steam-Welded Tubes direct from the nearest of 148 Factory Warehouses. He can save you money and serve you better.

The Mark of Quality

AMERICANS SHOULD PRODUCE THEIR OWN RUBBER . . Harvey S. Firestone

BOYERIZE those new cars—



Brake Pins
Brake Hangers
Brake Levers
Bushings
Center Bearings
Side Bearings
Chafing Plates
Manganese Brake Heads
Manganese Truck Parts
McArthur Turnbuckles



and keep operating costs where they belong—way down!

Low maintenance records have been made with new car operation. But these must inevitably rise as time goes on. The degree of increase depends largely on the parts with which they are equipped.

BOYERIZE!

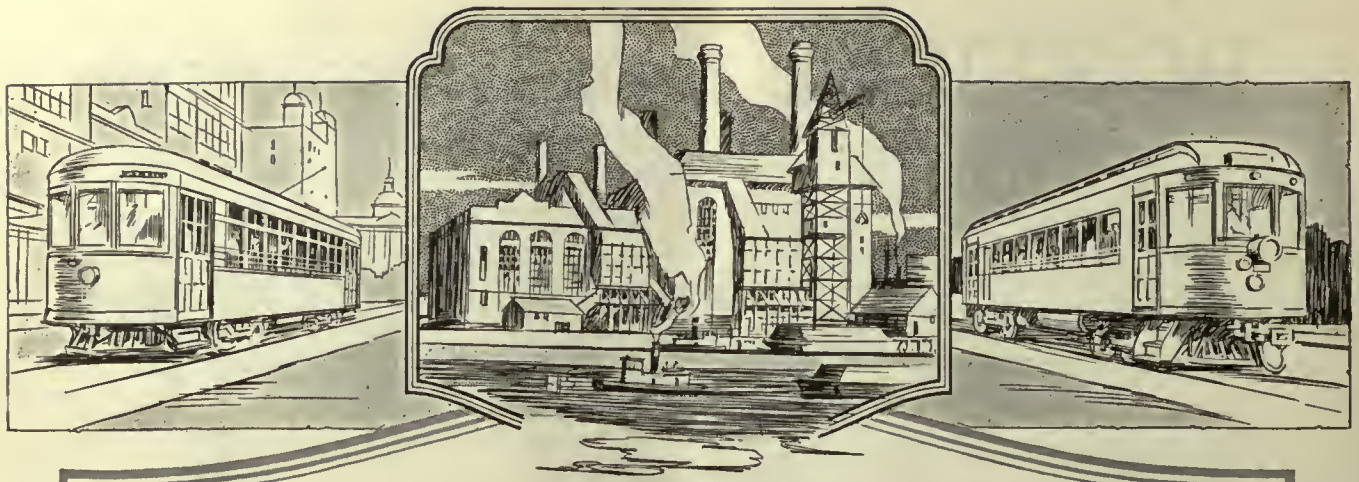
With modern Boyerized parts you take a decisive step in the direction of *permanently* low maintenance. In every type of service Boyerized parts have proved that they will outwear ordinary steel parts three to four times.

Why not order a few Boyerized parts for trial? You'll soon agree we're right in our claims. Write for the complete list.

Bemis Car Truck Company
Electric Railway Supplies
Springfield, Mass.

Representatives:
Economy Electric Devices Co., Old Colony Bldg., Chicago, Ill.
F. F. Bodler, 903 Monadnock Bldg., San Francisco, Cal.
W. F. McKenney, 54 First Street, Portland, Ore.
J. H. Denton, 1328 Broadway, New York City, N. Y.
A. W. Arlin, 772 Pacific Electric Bldg., Los Angeles, Cal.





Down to the Last Switch

Thousands of miles of Electric Railway properties throughout the country are now lubricated by TEXACO down to the last switch.

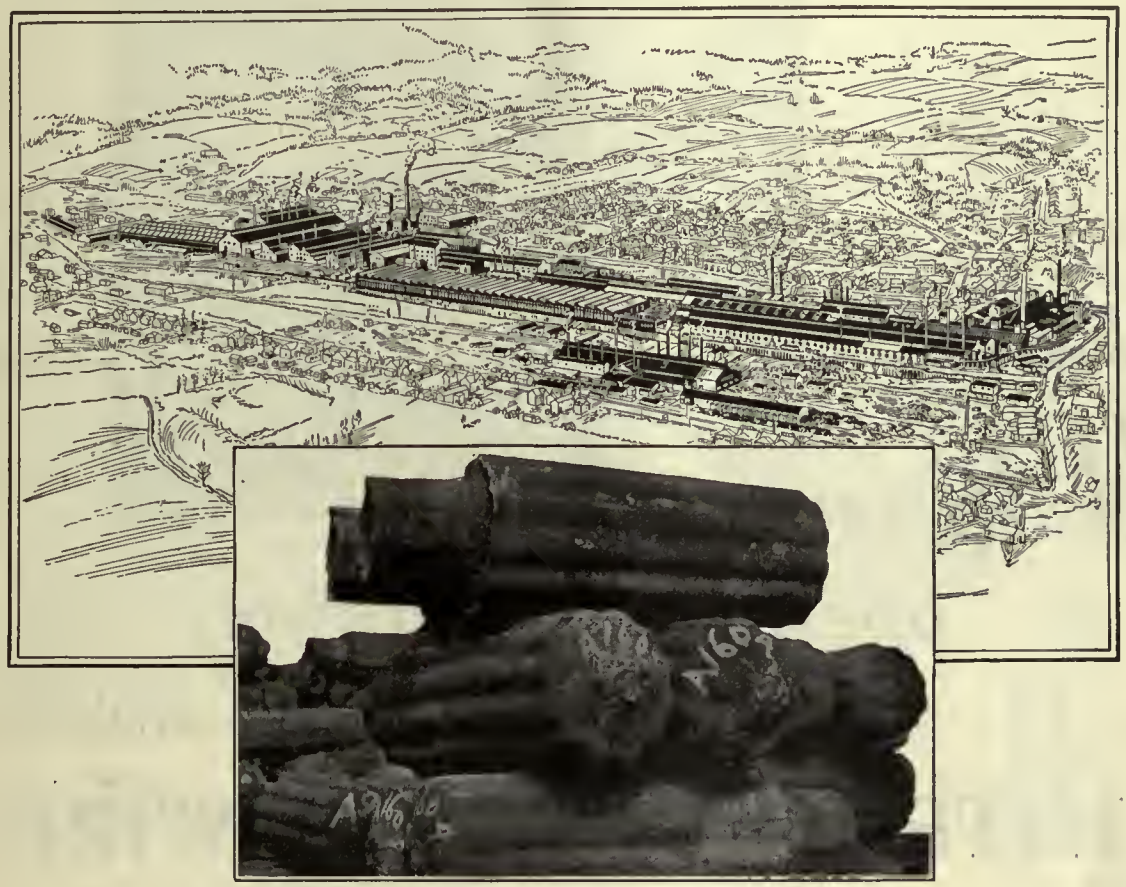
The TEXACO Engineer recommends the kind of oil or grease, and the quantity, to be used for each individual unit. Satisfaction is guaranteed by an organization of unquestioned standing.

And lubrication worries are no longer a part to be put up with.

Call on us at any time to survey your property without obligation but with an assurance of intelligent cooperation.

There is a TEXACO Lubricant for every purpose.

THE TEXAS COMPANY
Texaco Petroleum Products
17 BATTERY PLACE, NEW YORK CITY
Department EN1
OFFICES IN PRINCIPAL CITIES



100% STANDARD

STARTING with the making of our own steel ingots (shown above), every process in the production of "Standard" Steel Wheels, Armature Shafts and Axles is conducted at our plant at Burnham, Pa. These vital parts are, therefore, 100% "Standard."

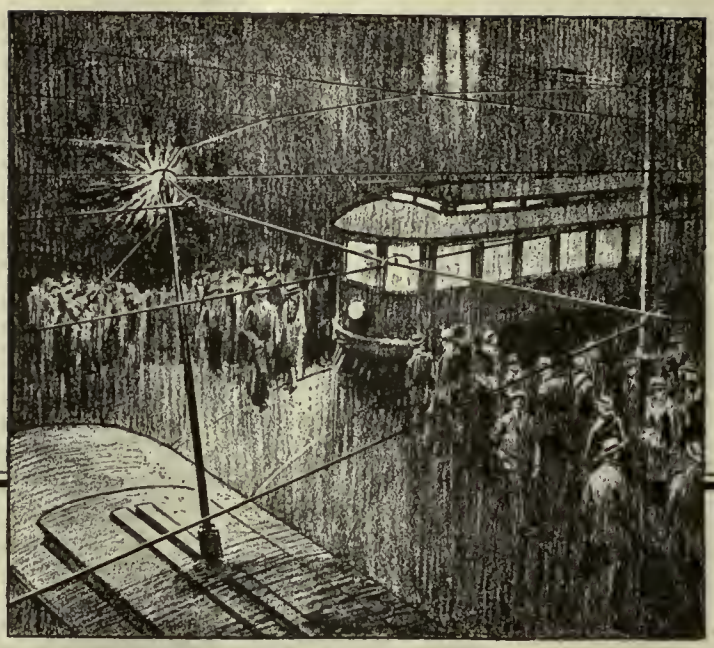
STANDARD STEEL WORKS COMPANY

PHILADELPHIA, PA.

BRANCH OFFICES:

CHICAGO
ST. LOUIS
NEW YORK
HOUSTON
PORTLAND
RICHMOND
SAN FRANCISCO
ST. PAUL
PITTSBURGH
MEXICO CITY

WORKS: BURNHAM, PA.



Where operating conditions are unusually severe

HITENSO TROLLEY WIRE

HITENSO Trolley Wire, exclusively an Anaconda product, combines high strength with the least possible sacrifice in conductivity.

Hitenso "C" meets the strength requirements of the A.E.R.A. specifications for High Strength Bronze, and exceeds the conductivity by 15%. Hitenso "A" meets the specifications for Medium Strength Bronze and exceeds the conductivity by 15%. In terms of electrical efficiency, Hitenso "C" is 37½% better than High Strength Bronze, and Hitenso "A", 23% better than Medium Strength Bronze.

ANACONDA COPPER MINING CO.—THE AMERICAN BRASS COMPANY
Rod, Wire and Cable Products
General Offices: 25 Broadway, New York Chicago Office: 111 W. Washington St.

ANACONDA WIRE PRODUCTS





The Power that is Yours

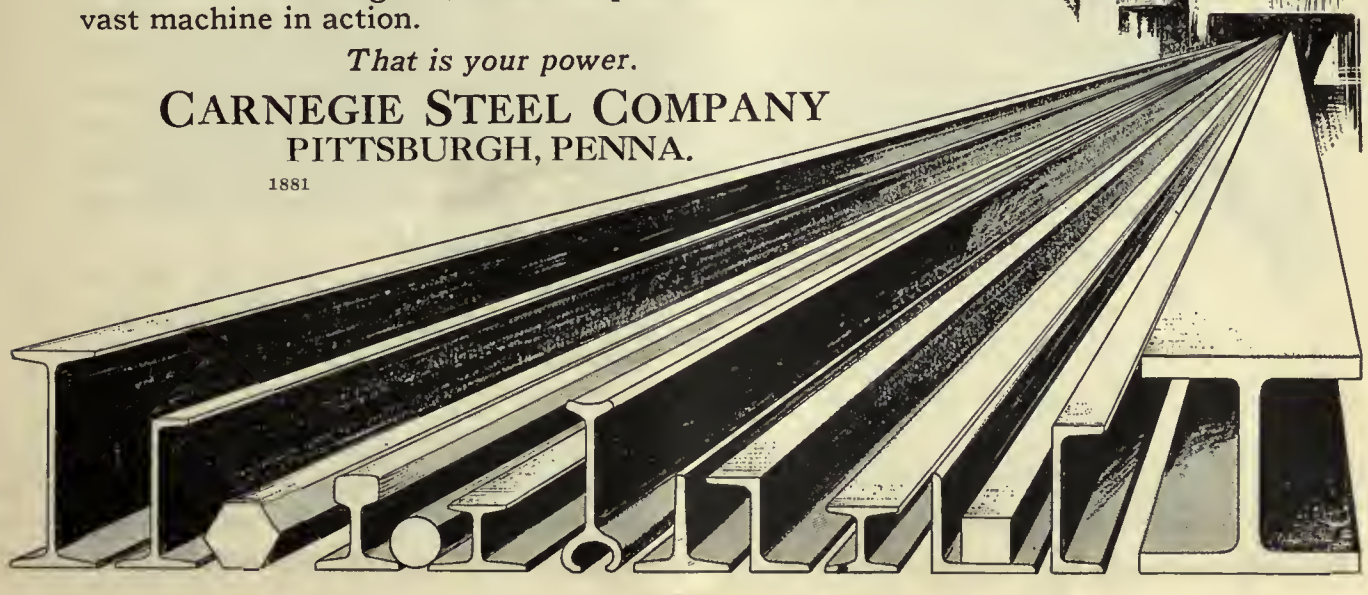
Vast ore ranges, stripped and torn—massive freighters, laden with their plunder—miles and miles of glistening rails—locomotives, rushing, puffing—quarries, rocked by thundering explosives—coal mines, yielding up their treasure—gigantic furnaces, belching flame—molten metal, flowing, splashing; then finally subdued and shaped—perhaps into great beams to form the skeleton of towering skyscrapers—perhaps into a minute shape used in the construction of a toy.

The control of these tremendous forces is Carnegie Service. Your telegram, letter or phone-call sets this vast machine in action.

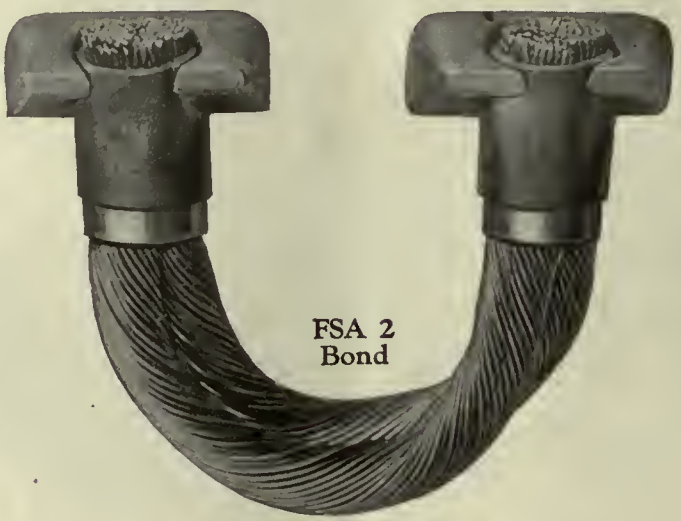
That is your power.

CARNEGIE STEEL COMPANY
PITTSBURGH, PENNA.

1881



American Steel and Wire Company



FSA 2
Bond



FSC
Bond

Reliable Performance with Simplicity of Application

Here are two of the best all 'round welded bonds on the market. The terminals are designed to fit the rail joints and are easy to apply. The simplicity of application with our alloy flux wire combined with the ease with which the oxy-acetylene flame can be manipulated insures efficient and lasting attachment of these Flameweld Bonds.

Our engineers are ready at all times to assist you. Samples and literature gladly furnished on request.

SALES OFFICES

CHICAGO . 208 So. La Salle Street
CLEVELAND . . Rockefeller Bldg.
DETROIT . . Foot of First Street
CINCINNATI . . Union Trust Bldg.
MINNEAPOLIS—ST. PAUL
Merchants Nat'l Bk. Bldg., St. Paul
ST. LOUIS . . . 506 Olive Street
KANSAS CITY . 417 Grand Avenue
OKLAHOMA CITY
First National Bank Bldg.
BIRMINGHAM . Brown-Marx Bldg.
MEMPHIS
Union and Planters Bank Bldg.
NEW YORK . . 30 Church Street
BOSTON . . 185 Franklin Street
PITTSBURGH . . . Frick Bldg.
PHILADELPHIA . Widener Bldg.
ATLANTA . . 101 Marietta Street
WORCESTER . . 94 Grove Street
BALTIMORE . 32 So. Charles Street
BUFFALO . . 670 Ellicott Street
WILKESBARRE . . Miners Bldg.
DALLAS . . . Praetorian Bldg.
DENVER . First National Bank Bldg.
SALT LAKE CITY . Walker Bk. Bldg.



The new "up to the minute" street cars recently built for the Georgia Railway and Power Company of Atlanta, Georgia, are all equipped with

Chilled Tread Wheels

Cost less per ton mile and carry a service guarantee—Better Every Year



A. R. A. Standards

650-lb. Wheel for 30-ton Cars
700-lb. Wheel for 40-ton Cars
750-lb. Wheel for 50-ton Cars
850-lb. Wheel for 70-ton Cars

ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS
1847 McCORMICK BUILDING · CHICAGO



Facts About a Remarkable Bolt

1. Its threads are as accurate as those of a hardened and ground gauge.
2. Its minimum tensile strength is 80,000 lbs.
3. * It is cold-headed yet the head will not come off.
4. It resists the effects of moisture and dampness.
5. It is exactly identical with every other Empire Bolt of the same size and style.
6. It saves time in assembly and reduces scrap to a minimum.

The head will NOT *come off*

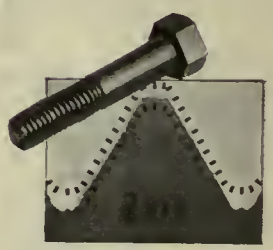
EMPIRE *New Process* Bolts are made "cold" in their entirety—up to the point of heat treating. Experience has shown that a bolt made in this manner is stronger in every respect than the old "hot" method of bolt-making. But it has taken years and the experience and skill of R.B.&W. men to find out just how to make bolts "cold." The cold-heading of the bolt is one of the greatest of our achievements. So perfectly has this been worked out that we guarantee the head of an Empire *New Process* Bolt will not fly off under the most severe abuse.

Samples for testing on request.

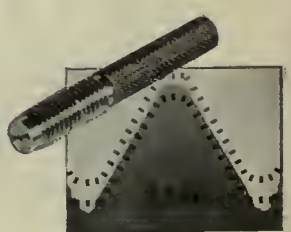
RUSSELL, BURDSALL & WARD BOLT & NUT COMPANY
PORT CHESTER, N.Y.

Branch Offices: CHICAGO · DETROIT · Branch Factory: ROCK FALLS, Ills. · Stocks at Gillies Co. SEATTLE · Hayward & Hartwell, Inc. SAN FRANCISCO

Makers of Bolts, Nuts and Rivets Since 1842



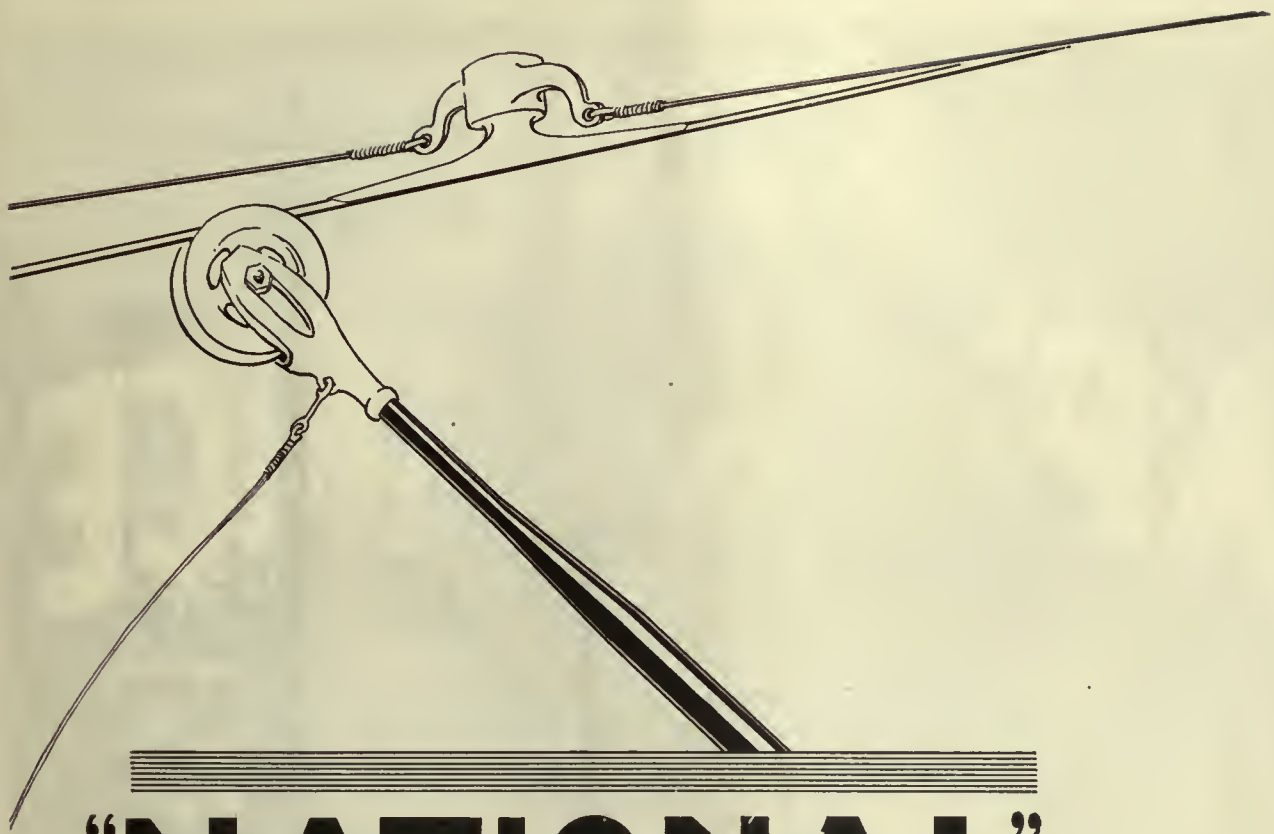
This is the thread profile of an Empire New Process Bolt as projected by the screw thread comparator.



This is the thread of a hardened and ground gauge as projected by the screw thread comparator.

EMPIRE *New Process* BOLTS

over 80,000 lbs. tensile strength



"NATIONAL" SHELBY SEAMLESS STEEL TROLLEY POLES

COMBINE MINIMUM WEIGHT WITH MAXIMUM STRENGTH

They are manufactured in two standard grades designed to meet the different requirements as to strength and service imposed by beam stresses, shock, and other conditions regularly encountered in trolley operation, and are thoroughly tested before leaving the mill.

Ask for Booklet—The "SHELBY" Seamless Cold Drawn Steel Trolley Pole.

THE RECOGNIZED STANDARD OF SEAMLESS STEEL TROLLEY POLES

NATIONAL TUBE COMPANY

Frick Building, Pittsburgh, Pa.

DISTRICT SALES OFFICES IN THE LARGER CITIES

STEEL FOR SERVICE



INTERNATIONAL Creosoted Pine Poles provide the most permanent line which combines good appearance with greatest strength.

International Creosoted Poles have been used for city distribution for more than 28 years and are still sound. They are being used more and more every day.

Illustration shows 40 ft. 7 in. top International Poles in the Lexington, N. C., property of the Municipal Water and Light Department. Top lines carry 2300 volt primary and bottom lines carry 110 volt secondary.

International Creosoting & Construction Co.
Texarkana — Beaumont — Galveston

Distributed by Graybar Electric Company

International Creosoted Yellow Pine Poles

After 10½ years running 630,000 miles—



"Tool Steel" Gears and Pinions show but ⅓ of wear allowable

Contrast this with two high grade special quenched gears and pinions which we put on the same car at the same time for a comparative test. Note the result.

"Tool Steel" Pinions—10 1/2 years show only 1/3 of allowable wear.
Special Quenched Pinions—6 3/4 years completely worn out.

On April 25, 1916, "Tool Steel" and special Quenched Gears and Pinions were put on the same car. In January 1923, 6¾ years later, the Special Quenched Pinions were completely worn out. On November 15, 1926, 10½ years later an inspection showed by micrometer test that the "Tool Steel" Pinions were worn but 1/3 the allowable wear.

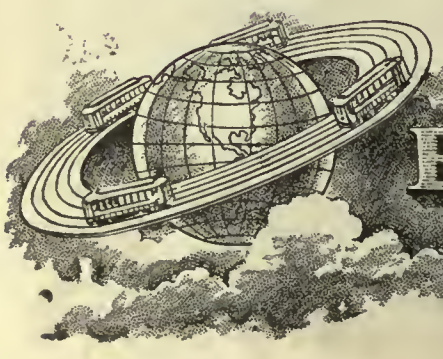
The result was that another customer standardized on "Tool Steel" Gears and Pinions.



TOOL-STEEL QUALITY GEARS AND PINIONS
The Standard of Quality

THE
Tool Steel Gear & Pinion Co.
CINCINNATI, OHIO

JUST as the electric railway companies have to compile and be guided by exhaustive statistics as to peak loads, traffic densities, costs per mile, and so forth, we must constantly keep ourselves informed as to purchasing power, density of population and all vital market information in order to maintain our service as an active asset of your service.



Barron G. Collier
INCORPORATED
CANDLER BLDG. NEW YORK

1902—1927

A National Organization

To Improve and Extend the Uses of Concrete

This phrase states in formal language the purpose of the Portland Cement Association. Organized in 1902, by a group of manufacturers, it completes in 1927 a quarter-century of existence.

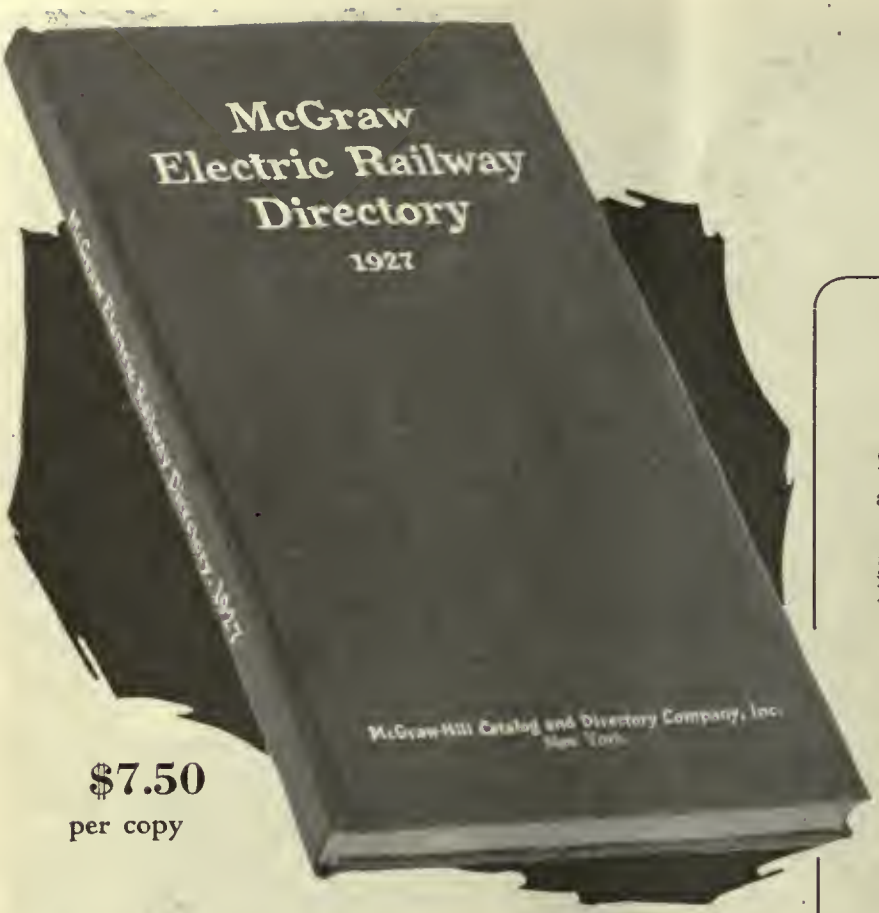
The General Headquarters, pictured below, houses the executive offices and research laboratories and exemplifies many interesting uses of concrete. You are cordially invited to inspect it, and to utilize the national service of this organization.

PORTLAND CEMENT ASSOCIATION

33 West Grand Avenue · Chicago

Offices in 32 Cities





$7.50
per copy

New Edition Now Ready!

The standard reference authority of the Electric Railway Industry now available in a new, completely revised edition. Brought up to date from data gathered by direct contact with the more than 1,300 companies listed.

Arranged in a new type style affording greater legibility and quicker reference.

Other improvements include the *geographic* listing of all Holding Companies which are indicated by a star (*) in the body of the book, as well as in the complete *alphabetical index* of electric railway companies. All towns reached by each road are shown both under the company listing and in their proper alphabetical position. Reference to any town thus gives you the data on all properties in that town, together with the names of all officials also located there.

If you haven't sent in your order for the new Edition—fill out the convenient memo on this page and mail it today!

PARTIAL LIST OF CONTENTS

A complete directory of the electric railway companies in the United States, Canada, Mexico and the West Indies.

Names and addresses of officials and principal department heads, including purchasing agents, master mechanics, supt. of power plants, etc.

Names of subsidiary bus companies.

Names of principal communities reached by each company.

Names and addresses and officers of affiliated holding or controlling companies and lists of properties controlled by each.

Location of repair shops.

Location and the total capacity of power plants.

Mileage of the road, owned, leased and trackage rights.

Gage of track.

Number and kind of cars used.

Number of buses operated.

Number of garages, capacity and their location.

Rates of fare.

Transmission and trolley voltages.

Officers and executive committees of Electric Railway Associations.

Commissioners and principal assistants of National and State Railway and Public Utility Commissions.

Alphabetical list of electric railway officials, giving company connections.

McGraw Electric Railway Directory,
475 Tenth Ave., New York.

Gentlemen:

Please send——copies of the 1927 Edition to

Company _____

Address _____

Attention of _____

Griffin Wheel Company

410 North Michigan Ave.
Chicago, Ill.

Griffin Wheels

with
Chilled Rims
and
Chilled Back of Flanges
For Street and Interurban Railways

FOUNDRIES:

Chicago	Boston	St. Paul
Detroit	Kansas City	Los Angeles
Denver	Council Bluffs	Tacoma
Cleveland	Salt Lake City	Cincinnati

PANTASOTE

TRADE MARK

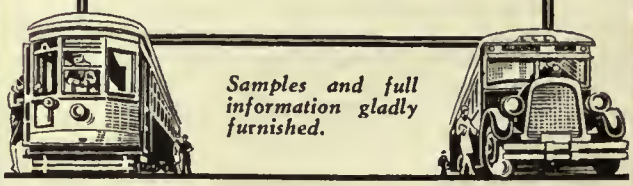
—the car curtain and upholstery material that pays back its cost by many added years of service. Since 1897 there has been no substitute for Pantasote.

AGASOTE

TRADE MARK

—the only panel board made in one piece. It is homogeneous and waterproof. Will not separate, warp or blister.

Standard
for electric railway cars
and motor buses



Samples and full information gladly furnished.

The PANTASOTE COMPANY, Inc.
250 Park Avenue, NEW YORK

Greater Service Per Dollar Invested



"Tiger" Bronze Axle and Armature Bearings

More-Jones "Tiger" Bronze castings for axle and armature bearing service was one of our early achievements. This is probably the most widely known bronze on the market. It has stood the test of time. There is nothing better for long, efficient and most economical results. Let us quote you.

National Bearing Metals Corporation
St. Louis, Mo.

MORE-JONES QUALITY PRODUCTS

Why Le Carbone Carbon Brushes?



Reason No. 12

Calculate the service they deliver and figure out the cost of carbon brushes per car mile. This will give you still another reason why it pays to standardize upon "Le Carbone" carbon brushes.

They talk for themselves

W. J. Jeandron
Factory Terminal Bldg.
Fifteenth Street, Hoboken, N. J.
Pittsburgh Office: 634 Wabash Bldg.
Chicago Office: 1657 Monadnock Block
San Francisco Office: 525 Market Street
Canadian Distributors: Lyman Tube & Supply Co., Ltd.
Montreal and Toronto



R 11 Double Register

Both our latest single and double registers are now equipped for electric as well as mechanical hand or foot operation.

Full Electric Operation of Fare Registers

A completely satisfactory fare registration system is one that has the confidence of the public, the conductor and the accounting department. The simplicity and accuracy of International Registers maintained for more than thirty years, is combined in the later types with the extra speed and convenience of electric operation.

The International Register Co.
15 South Throop St., Chicago

Speedy—
like a "skip-stop" schedule!

JUST as "skip-stop" speeds up schedules, Oakite cleaning materials and methods speed up all shop cleaning and washing.

For, with Oakite materials, cleaning action starts immediately the solution is applied. And it proceeds, uninterrupted,—removing grease, oil and dirt quickly and effectively—until every final trace is gone. Trucks and bodies, and their parts, are thoroughly cleaned—at an absolute minimum of time.

Write for illustrated booklet giving complete details. No obligation.

Oakite Service Men, cleaning specialists, are located in the leading industrial centers of the U. S. and Canada

Oakite is manufactured only by
OAKITE PRODUCTS, INC., 28B Thames St., NEW YORK, N. Y.
(Formerly OAKLEY CHEMICAL CO.)

OAKITE
TRADE MARK REG U.S. PAT. OFF.
Industrial Cleaning Materials and Methods

Bethlehem Products for Electric Railways

Tee and Girder Rails; Machine Fitted Joints; Splice Bars; Hard Center Frogs; Hard Center Mates; Rolled Alloy Steel Crossings; Abbott and Center Rib Base Plates; Rolled Steel Wheels and Forged Axles; Tie Rods; Bolts; Tie Plates and Pole Line Material.

Catalog Sent on Request

BETHLEHEM STEEL COMPANY, Bethlehem, Pa.

BETHLEHEM

SPECIAL TRACKWORK
of the famous
TISCO MANGANESE STEEL

WM. WHARTON JR. & CO., INC.
EASTON, PA.

Sales Offices:
Boston Chicago El Paso Montreal New York Philadelphia
Pittsburgh San Francisco Scranton

Lorain Special Trackwork Girder Rails

Electrically Welded Joints

THE LORAIN STEEL COMPANY
Johnstown, Pa.
Sales Offices:
Atlanta Chicago Cleveland New York
Philadelphia Pittsburgh Dallas
Pacific Coast Representative:
United States Steel Products Company
Los Angeles Portland San Francisco Seattle
Export Representative:
United States Steel Products Company, New York, N. Y.

Atlanta
Baltimore
Boston
Buffalo
Chicago
Cincinnati
Cleveland
Dallas
Detroit
Indianapolis
Kansas City
Los Angeles
Milwaukee
Minneapolis
New Orleans
New York
Philadelphia
Pittsburgh
San Francisco
St. Louis
Syracuse
Seattle
Washington, D. C.
Berlin, Germany

Investigations • Reports
Valuations

The American Appraisal Company

A National Organization



Time is the great test. The most efficient and permanent insulation known is

KERITE

KERITE INSULATED WIRE & CABLE COMPANY
NEW YORK CHICAGO

ELECTRICAL INSULATION

PERFECT MICANITE INSULATOR REG. U.S. PAT. OFF. and PERFECT EMPIRE INSULATOR REG. U.S. PAT. OFF.

Micanite and Super-Micanite Sheets, Commutator Segments, and Commutator Rings.

Micanite Tubes and Washers

Linotape, Seamless or Sewn Bias *(Yellow or Black Varnished Tapes)*

Empire Oiled Cloths and Papers *(Yellow or Black)*

Compounds, Varnishes, Etc.

Send for catalog and helpful booklet on Commutator Insulation and Assembly

MICA INSULATOR COMPANY

Largest manufacturers in the world of mica insulation.
Established 1893.

New York: 68 Church St. Chicago: 542 So. Dearborn St.

Cleveland Pittsburgh Cincinnati
San Francisco Los Angeles Seattle

Works: Schenectady, New York. Victoriaville, Canada; London, England



Complete satisfaction

Operating perfectly and requiring minimum attention for maintenance and lubrication, Earll Catchers and Retrievers give genuinely satisfactory results. Their refinement of design, and mechanical superiority are summarized in the following five features, peculiar to Earll construction.

No-wear Check Pawl
Free-Winding Tension Spring
Ratchet Wind
Emergency Release
Perfect Automatic Lubrication

Earll Catchers and Retrievers

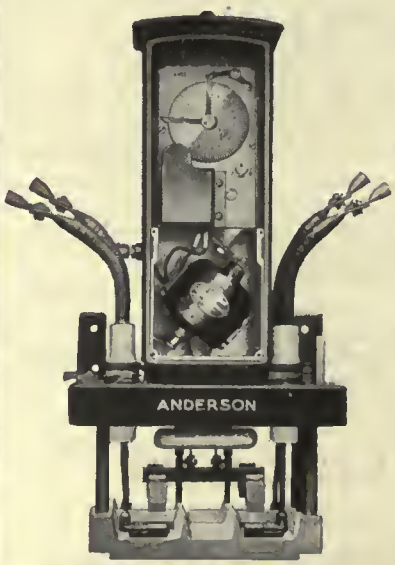
C. I. EARLL, York, Pa.

Canadian Agents:
Railway & Power Engineering Corp., Ltd., Toronto, Ont.
In All Other Foreign Countries:
International General Electric Co., Schenectady, N. Y.

Electrically Wound Time Switches

Where weekly winding is inconvenient, this self-winding time switch can be used to good advantage.

It is motor driven and a reserve is provided which will keep the Time Switch operating as usual for about three days, should the motor circuit be temporarily disconnected.



Type SL double pole oil break with oil tank and door removed. Front plate also removed showing winding motor.

The Season Changing Device can be inserted in this switch whereby the operation of the Time Switch follows the lengthening and shortening of days — literally following the sun.

Albert & J. M. Anderson Mfg. Co.
289-305 A St.,
Boston, Mass.

NEW YORK
CHICAGO
PHILADELPHIA
LONDON

Bankers and Engineers

Ford, Bacon & Davis
Incorporated

Engineers

115 Broadway, New York
PHILADELPHIA CHICAGO SAN FRANCISCO

The J. G. White Engineering Corporation

Engineers—Constructors

Oil Refineries and Pipe Lines, Steam and Water Power Plants, Transmission Systems, Hotels, Apartments, Office and Industrial Buildings, Railroads.

43 Exchange Place New York

STONE & WEBSTER
Incorporated

Design and Construction
Examinations Reports Appraisals
Industrial and Public Service Properties

NEW YORK BOSTON CHICAGO

THE BEELER ORGANIZATION

Transportation, Traffic, Operating Surveys
Better Service—Financial Reports
Appraisals—Management

52 Vanderbilt Ave. New York

SANDERSON & PORTER
ENGINEERS
PUBLIC UTILITIES & INDUSTRIALS

Design Construction Management
Examinations Reports Valuations

CHICAGO NEW YORK SAN FRANCISCO

J. ROWLAND BIBBINS

Engineer—2301 Connecticut Ave., N.W., Washington, D. C.

TRANSPORTATION SURVEYS
Organized Traffic Relief and Transit Development
Co-ordinating Motor Transport, Railroad and City Plans, Service, Routing, Valuation, Economic Studies
EXPERIENCE IN 20 CITIES

ALBERT S. RICHEY
ELECTRIC RAILWAY ENGINEER
WORCESTER, MASSACHUSETTS
REPORTS - APPRAISALS - RATES - OPERATION - SERVICE

ENGELHARDT W. HOLST

Consulting Engineers

Appraisals Reports Rates Service Investigation
Studies on Financial and Physical Rehabilitation
Reorganization Operation Management

683 Atlantic Ave., BOSTON, MASS.

LINN & MARSHALL, *Inc.*

Financing — Engineering — Management

PUBLIC UTILITIES
ELECTRIC RAILWAYS — MOTOR BUSES —
GAS — ELECTRIC
25 Broadway, New York City

DAY & ZIMMERMANN, INC.
ENGINEERS
DESIGN - CONSTRUCTION - REPORTS
VALUATIONS - MANAGEMENT

NEW YORK PHILADELPHIA CHICAGO

STEVENS & WOOD
INCORPORATED
ENGINEERS AND CONSTRUCTORS
120 BROADWAY, NEW YORK

ENGINEERING CONSTRUCTION YOUNGSTOWN, O. FINANCING MANAGEMENT

WALTER JACKSON

Consultant on Fares and Motor Buses

The Weekly and Sunday Pass—Differential Fares—Ride Selling
Holbrook Hall 5-W-3
160 Gramatan Ave., Mt. Vernon, N. Y.

HEMPHILL & WELLS
CONSULTING ENGINEERS

Gardner F. Wells Albert W. Hemphill

APPRAISALS
INVESTIGATIONS COVERING
Reorganization Management Operation Construction
43 Cedar Street, New York City

KELKER, DELEUW & CO.
CONSULTING ENGINEERS
REPORTS ON

Operating Problems Valuations Traffic Surveys

111 W. Washington Street, Chicago, Ill.

E. H. FAILE & CO.

Designers of

Garages— Service Buildings—Terminals

441 LEXINGTON AVE. NEW YORK

McCLELLAN & JUNKERSFELD
Incorporated
ENGINEERING AND CONSTRUCTION
Examinations—Reports—Valuations
Transportation Problems—Power Developments
68 Trinity Place, New York

Chicago St. Louis

THE BABCOCK & WILCOX COMPANY

85 Liberty Street, New York

Builders since 1868 of Water Tube Boilers of continuing reliability

BRANCH OFFICES

Boston, 80 Federal Street
Philadelphia, Packard Building
Pittsburgh, Farmers Deposit Bank Building
Cleveland, Guardian Building
Chicago, Marquette Building
Cincinnati, Traction Building
Atlanta, Candler Building
Phoenix, Ariz., Heard Building
Dallas, Tex., Magnolia Building
Honolulu, H. T., Castle & Cooke Building
Portland, Ore., Gasco Building

WORKS
Bayonne, N. J.
Barberton, Ohio

Makers of Steam Superheaters since 1898 and of Chain Grate Stokers since 1893

BRANCH OFFICES

Detroit, Ford Building
New Orleans, 344 Camp Street
Houston, Texas, Electric Building
Denver, 444 Seventeenth Street
Salt Lake City, Kearns Building
San Francisco, Sheldon Building
Los Angeles, Central Building
Seattle, L. C. Smith Building
Havana, Cuba, Calle de Aguiar 104
San Juan, Porto Rico, Royal Bank Building

A. L. DRUM & COMPANY

Consulting and Constructing Engineers

VALUATION AND FINANCIAL REPORTS
RATE STUDIES FOR PRESENTATION TO PUBLIC SERVICE COMMISSIONS
CONSTRUCTION AND MANAGEMENT OF ELECTRIC RAILWAYS

230 South Clark Street, Chicago, Ill.

PS HEATERS

Car Heating and Ventilating

—are no longer operating problems. We can show you how to take care of both with one equipment. The Peter Smith Forced Ventilation Hot Air Heater will save, in addition, 40% to 60% of the cost of any other car heating and ventilating system. Write for details.

The Peter Smith Heater Company
6209 Hamilton Ave., Detroit, Mich.

C. B. BUCHANAN, President
W. H. PRICE, JR., Sec'y-Treas.
JOHN F. LAYNG, Vice-President

BUCHANAN & LAYNG CORPORATION

Engineering and Management, Construction
Financial Reports, Traffic Surveys
and Equipment Maintenance

BALTIMORE
1004 Citizens National Bank Bldg.

Phone:
Hanover: 2142

NEW YORK
40 Wall Street

UNA

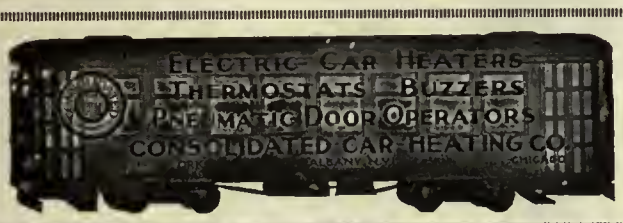
RAIL JOINTS
DYNAMOTORS
WELDING ROD

UNA Welding & Bonding Co.
Cleveland, Ohio.

THE P. EDWARD WISH SERVICE

50 Church St. NEW YORK
Street Railway Inspection DETECTIVES
131 State St. BOSTON

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.





Gets Every Fare

PEREY TURNSTILES or PASSIMETERS

Use them to your Prepayment Areas and Street Cars

Perey Manufacturing Co., Inc.
101 Park Avenue, New York City

"Bates Poles Outlive the Bond Issues that Buy Them"

BATES POLES AND STRUCTURES

Bates Expanded Steel Truss Co.

General Offices and Plants
EAST CHICAGO, INDIANA, U. S. A.

TULC
A LUBRICANT

We make a specialty of

ELECTRIC RAILWAY LUBRICATION

We solicit a test of TULC on your equipment

The Universal Lubricating Co.
Cleveland, Ohio
Chicago Representatives: Jameson-Ross Company, Straus Bldg.

THE WORLD'S STANDARD

"IRVINGTON"

Black Varnished Silk, and Varnished Cambric, Yellow Varnished Paper

Irv-O-Slot Insulation
Flexible Varnished Tubing
Insulating Varnishes and Compounds

Irvington Varnish & Insulator Co.
Irvington, N. J.

Sales Representatives:

Mitchell-Rand Mfg. Co., N. Y.
E. M. Wolcott, Rochester
I. W. Levine, Montreal
A. L. Gillies, Toronto
Prehler Brothers Inc., Chicago
White Supply Co., St. Louis
Clapp & LaMoree, Los Angeles
Martin Woodard, Seattle
Consumers' Rubber Co., Cleveland

POSITION VACANT

MANAGER: for prompt engagement with combined electric railway and motor bus operation in east central state, having fifty miles of operation; must be trained technician, with experience in dealing with public relationships and labor; reply with full particulars covering training, experience and references. P-58, Electric Railway Journal, 1600 Arch St., Phila., Pa.

POSITIONS WANTED

EXECUTIVE'S assistant—young electrical engineer with thorough practical and professional engineering experience, on electric railway equipment. Know how to manage labor. Believe in the future of the electric railway and have original ideas, some of which have been put into successful practice. Not afraid of work. Can produce results as an executive's assistant or in similar capacity. PW-56, Electric Railway Journal, Tenth Ave. at 36th Street, New York.

SUPERINTENDENT bus operation. Experienced executive in charge of transportation and maintenance 50 motor-busses on large electric railway property. Previous experience assistant superintendent of transportation handling discipline, labor cases, etc. Excellent references. C. V. Wood, Jr., 145 State Street, Springfield, Mass.

GENERAL superintendent or manager; fifteen years' successful experience. PW-55, Electric Railway Journal, Tenth Ave. at 36th St., New York.

WOULD like to correspond with any company needing a high-grade official in any capacity, in city or interurban railways. Can manage any or all departments in the most efficient manner. PW-33, Electric Railway Journal, Guardian Bldg., Cleveland, O.

FOR SALE

Used Electric Railway Material

INCLUDING

1—Double Truck Light weight Car, equipped with G.E. 264-A motors, $1250.00
1—Medium Double Truck Car, equipped with Stanley No. 401 motors, $600.00
1—Electric Locomotive.

Cash Fare Boxes; Electric Arc Welding Machine, fully equipped; complete Rail Switches, Spikes and Steel Bridges, and Overhead Trolley Supplies, new. Cookson Feed Water Heater, Gate Valves, Globe Valves, Flanges and Other Parts of Steam Plant Fittings used only 7 months.

All the foregoing in good condition and almost at your own prices. Pictures of cars furnished. Write

J. C. HOUSER, TEMPLE, TEXAS

FOR SALE

15 BIRNEY SAFETY CARS

Brill Built
West, 508 or G. E. 264 Motors
Cars Complete—Low Price—Fine Condition
ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

SALESMAN WANTED

SALES executive, formerly Eastern manager of prominent railway equipment house, seeks a connection with well established company desiring to increase its railway sales and be adequately represented in the East; he is 36 years of age, has a keen mechanical mind, is a proven executive, can direct a sales organization, understands the railway equipment business thoroughly and is well known in the industry; his sales contacts include all mechanical executive, purchasing agents, shop foremen, etc., in both the steam and electric railway field in addition to the various car builders. SA-57, Electric Railway Journal, Tenth Ave. at 36th St., New York.

Buying
Good Used Equipment

Is frequently the difference between having good needed equipment or doing without it.



Tie
Plates
—Switches—Frogs
—Portable Track
Finest Quality
Flat Cars—Locomotives
Quick Delivery *Lowest Price*

HYMAN-MICHAELS CO.
Peoples Gas Building
St. Louis CHICAGO San Francisco

COLUMBIA
1892
MACHINE WORKS

COLUMBIA

Railway Supplies and Equipment

Machine and
Sheet Metal Work

Forgings
Special Machinery
and Patterns

Grey Iron and
Brass Castings

Armature and
Field Coils.

The Columbia Machine Works *and M. I. Co.*
265 Chestnut St., corner Atlantic Ave.,
Brooklyn, New York



JOHNSON FARE COLLECTING SYSTEMS

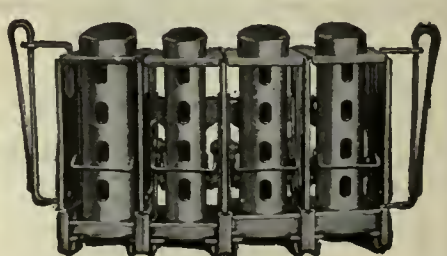


Johnson Electric Fare Boxes and overhead registers make possible the instantaneous registering and counting of every fare. Revenues are increased 1½ to 5% and the efficiency of one-man operation is materially increased. Over 4000 already in use.

When more than two coins are used as fare, the Type D Johnson Fare Box is the best manually operated registration system. Over 50,000 in use.

Johnson Change-Makers are designed to function with odd fare and metal tickets selling at fractional rates It is possible to use each barrel separately or in groups to meet local conditions. Each barrel can be adjusted to eject from one to five coins or one to six tickets.





Johnson Fare Box Co.
4619 Ravenswood Ave., Chicago, Ill.

TRACTION AND ELECTRIC LIGHT

PROPERTIES *for* SALE

THE Railway properties serving the City of Binghamton and its suburbs together with Johnson City and Endicott on the west extending about ten miles from Binghamton, including Binghampton Railway Bus Lines operating a fleet of seventeen buses in and about the City of Binghamton, Johnson City and Endicott, and serving about 125,000 people and also the lighting property in Endicott and portions of the Town of Union will be sold under decree in foreclosure on Thursday, December 1st, 1927 at 2:30 P.M. at the general offices of the Binghamton Railway Co., 375 State Street, in the City of Binghamton, N. Y.

The railroad proper contains 47.72 miles of single and double track. The equipment consists of seventeen buses and 79 cars all in good condition together with all necessary railway and electric light paraphernalia including a plant at Binghamton.

Opportunity will be given anyone seriously interested in the property to thoroughly examine its records and the physical property.

The Court of Appeals recently determined the rate making power exclusively in the Public Service Commission. Increase of fare to ten cents with a strip of four tickets for thirty cents put in operation on October 16th, 1927.

Binghamton proper has a population of about 80,000 and Johnson City, Endicott making up the other 45,000.

PARTICULARS OF SALE may be obtained from WILLIAM H. RILEY, special master to sell, 561 O'Neil Building, Binghamton, N. Y.

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Brakes
General Electric Co.
Westinghouse Air Brake Co.

Anchors, Guy
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Appraisals
American Appraisal Co.

Armature Shop Tools
Columbia Machine Works
Elec. Service Supplies Co.

Automatic Return Switch Stands
Ramapo Ajax Corp.

Automatic Safety Switch Stands
Ramapo Ajax Corp.

Axles
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Cincinnati Car Co.
Standard Steel Works Co.
Westinghouse E. & M. Co.

Babbit Metal
National Bearings Corp.

Babbitting Devices
Columbia Machine Works

Badges and Buttons
Elec. Service Supplies Co.
International Register Co.

Batteries, Dry
Nichols-Lintern Co.

Bearings and Bearing Metals
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works
National Bearings Corp.
Westinghouse E. & M. Co.

Bearings, Center and Roller Side
Columbia Machine Works
Stucki Co., A.

Bells and Buzzers
Consolidated Car Heating Co.

Bells and Gongs
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works
Elec. Service Supplies Co.

Benders, Rail
Railway Track-work Co.

Bodies, Bus
Brill Co., The J. G.
Cummings Car & Coach Co.
Graham Brothers

Body Material, Haskelite and Plymetl
Haskelite Mfg. Corp.

Boilers
Babcock & Wilcox Co.

Boiler Tubes
National Tube Co.

Bolts, Nuts, Rivets
Russell, Burdsall & Ward Bolt & Nut Co.

Bond Testers
American Steel & Wire Co.
Electric Service Supplies Co.

Bonding Apparatus
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.

Bonds, Rail
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, etc.)
Bates Expanded Steel Truss Co.
Columbia Machine Co.
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Brill Co., The J. G.
Cincinnati Car Co.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
American Brake Shoe & Foundry Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Wheel Truing Brake Shoe Co.

Brakes, Brake Systems and Brake Parts
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Co.
General Electric Co.
National Brake Co.
Safety Car Devices Co.
Westinghouse Tr. Br. Co.

Brakes, Magnetic Rail
Cincinnati Car Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
Westinghouse E. & M. Co.

Brushholders
Columbia Machine Works
General Electric Co.

Bulkheads
Haskelite Mfg. Corp.

Buses
Cummings Car & Coach Co.
General Electric Co.
Yellow Truck & Coach Co.

Bushings, Case Hardened & Manganese
Brill Co., The J. G.
Bemis Car Truck Co.
Cincinnati Car Co.
Columbia Machine Works

Cables. (See Wires and Cables)

Cambric Tapes, Yellow and Black Varnish
General Electric Co.
Irvington Varnish & Ins. Co.

Cambric Yellow and Black Varnish
Mica Insulator Co.

Carbon Brushes (See Brushes, Carbon)

Car Lighting Fixtures
Elec. Service Supplies Co.

Car Panel Safety Switches
Consolidated Car Heat. Co.
Westinghouse E. & M. Co.

Car Steps, Safety
Cincinnati Car Co.

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Cars, Dump
Brill Co., The J. G.
Differential Steel Car Co., Inc.

Cars, Gas-Electric
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co.

Cars, Gas, Rail
Brill Co., The J. G.

Cars, Passenger, Freight, Express, etc.
Amer. Car Co.
Brill Co., The J. G.
Cincinnati Car Co.
Cummings Car & Coach Co.
Kuhlman Car Co., G. C.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Cars, Self-Propelled
Brill Co., The J. G.

Castings, Brass Composition or Copper
Anderson Mfg. Co., A. & J. M.
Cincinnati Car Co.
Columbia Machine Works
National Bearings Corp.

Castings, Gray Iron and Steel
American Bridge Co.
American Steel Foundries
Bemis Car Truck Co.
Columbia Machine Works
Standard Steel Works Co.

Castings, Malleable & Brass
Bemis Car Truck Co.
Columbia Machine Works

Catchers and Retrievers, Trolley
Earll, C. I.
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Ceiling Car
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Ceilings, Plywood, Panels
Haskelite Mfg. Corp.

Cement Products
Portland Cement Co.

Change Carriers
Cleveland Fare Box Co.
Electric Service Supplies Co.

Change Trays
Cincinnati Car Co.

Circuit-Breakers
Anderson Mfg. Co., A. & J. M.
General Electric Co.
Westinghouse E. & M. Co.

Clamps and Connectors for Wires and Cables
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Westinghouse E. & M. Co.

Cleaners
Oakite Products

Cleaners and Scrapers, Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Cincinnati Car Co.
Ohio Brass Co.
St. Louis Car Co.

Coal and Ash Handling (See Conveying and Hoisting Machinery)

Coil Banding and Winding Machines
Columbia Machine Works
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

Coils, Armature and Field
Columbia Machine Works
General Electric Co.
Westinghouse E. & M. Co.

Coils, Choke and Kicking
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Coin Counting Machines
Cleveland Fare Box Co.
International Register Co.
Johnson Fare Box Co.

Coin Changers
Johnson Fare Box Co.

Coin Sorting Machines
Cleveland Fare Box Co.
Johnson Fare Box Co.

Coin Wrappers
Cleveland Fare Box Co.

Commutator Slotters
Columbia Machine Works
Elec. Service Supplies Co.
Westinghouse E. & M. Co.
Wood Co., Chas. N.

Commutators or Parts
General Electric Co.
Westinghouse E. & M. Co.

Compressors, Air
General Electric Co.
Westinghouse Tr. Br. Co.

Condensers
Westinghouse E. & M. Co.

Condensor Papers
Irvington Varnish & Ins. Co.

Connectors, Solderless
Westinghouse E. & M. Co.

Connectors, Trailer Car
Columbia Machine Works
Consolidated Car Heat. Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Controllers or Parts
Columbia Machine Works
General Electric Co.
Westinghouse E. & M. Co.

Controller Regulators
Elec. Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse E. & M. Co.

Converters, Rotary
General Electric Co.
Westinghouse E. & M. Co.

Copper Wire
American Brass Co.
American Steel & Wire Co.
Anaconda Copper Mining Co.

Copper Wire Instruments, Measuring, Testing and Recording
American Brass Co., The
American Steel & Wire Co.
Anaconda Copper Mining Co.

Cord, Bell, Trolley, Register, etc.
American Steel & Wire Co.
Brill Co., The J. G.
Elec. Service Supplies Co.
International Register Co.
Roebling's Sons Co., John A.
Samson Cordage Works

Cord Connectors and Couplers
Elec. Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
American Steel Foundries
Brill Co., The J. G.
Cincinnati Car Co.
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Cowl Ventilators
Nichols-Lintern Co.

Cranes, Hoists and Lifts
Buda Co., The
Electric Service Supplies Co.

Cross Arms (See Brackets)

Crossings
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossing Foundations
International Steel Tie Co.

Crossings, Frog and Switch
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossing Signals. (See Signal Systems, Highway Crossing)

Crossings, Track (See Track, Special Work)

Crossings, Trolley
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Curtains & Curtain Fixtures
Brill Co., The J. G.
Pantasote Co., Inc.

Cutting Apparatus
General Electric Co.
Ohio Brass Co.
Railway Track Work Co.

Dealer's Machinery & Second Hand Equipment
Elec. Equipment Co.
Hyman Michaels Co.

Derailing Switches
Ramapo Ajax Corp.

Destination Signs
Columbia Machine Works
Elec. Service Supplies Co.

Detective Service
Wish Service, Edward P.

Door Operating Devices
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Heat. Co.
National Pneumatic Co.
Safety Car Devices Co.

Doors and Door Fixtures
Brill Co., The J. G.
Cincinnati Car Co.
Hale-Kilburn Co.

Doors, Folding Vestibule
National Pneumatic Co.
Safety Car Devices Co.

Drills, Track
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Dryers, Sand
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Ears
Columbia Machine Works
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Electric Grinders
Railway Track-work Co.

Electrical Wires and Cables
Amer. Electrical Works
Amer. Steel & Wire Co.
John A. Roebling's Sons Co.

Electrodes, Carbon
Railway Track-work Co.
Una Welding & Bonding Co.

Electrodes, Steel
Railway Track-work Co.
Una Welding & Bonding Co.

Engineers, Consulting, Contracting and Operating
Beeler, John A.
Bibbins, Rowland J.
Buchanan & Layng Corp.
Day & Zimmermann, Inc.
A. L. Drum & Co.
Faile & Co., E. H.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & DeLeuw
Linn & Marshall Co.
McClellan & Junkersfeld
Richey, Albert S.
Sanderson & Porter
Stevens & Wood
Stone & Webster
White Eng. Co., J. G., The

Engines, Gas, Oil or Steam
Westinghouse E. & M. Co.

Exterior Side Panels
Haskelite Mfg. Corp.

Fare Boxes
Cleveland Fare Box Co.
Johnson Fare Box Co.
Perey Mfg. Co.

Fare Registers
Elec. Service Supplies Co.
Johnson Fare Box Co.

Fences, Woven Wire and Fence Posts
Amer. Steel & Wire Co.

Fenders and Wheel Guards
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Fender Co.
Star Brass Works
Wood Co., Chas. N.

Fibre and Fibre Tubing
Westinghouse E. & M. Co.

Field Coils (See Coils)

Floodlights
Elec. Service Supplies Co.
General Electric Co.

Floor, Sub
Haskelite Mfg. Corp.

Floors
Haskelite Mfg. Corp.

Forgings
Brill Co., The J. G.
Cincinnati Car Co.
Standard Steel Works Co.

Frogs & Crossings, Tee Rail
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Frogs, Track (See Track Work)

Frogs, Trolley
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

(Continued on page 52)

"The Standard for Rubber Insulation"

INSULATED WIRES and CABLES

"Okonite," "Manson," and Dundee "A" "B" Tapes

Send for Handbook

The Okonite Company

The Okonite-Callender Cable Company, Inc.

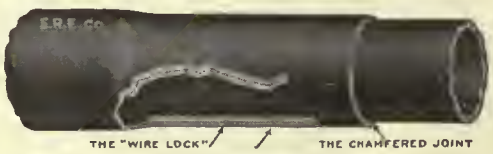
Factories, PASSAIC, N. J. PATERSON, N. J.

Sales Offices: New York Chicago Pittsburgh St. Louis Atlanta Birmingham San Francisco Los Angeles Seattle

Pettingell-Andrews Co., Boston, Mass.
F. D. Lawrence Electric Co., Cincinnati, O.
Novelty Electric Co., Phila., Pa.

Can. Rep.: Engineering Materials Limited, Montreal.
Cuban Rep.: Victor G Mendoza Co., Havana.

ELRECO TUBULAR POLES



COMBINE

Lowest Cost Lightest Weight
Least Maintenance Greatest Adaptability

Catalog complete with engineering data sent on request.

ELECTRIC RAILWAY EQUIPMENT CO.
CINCINNATI, OHIO
New York City, 30 Church Street

The DIFFERENTIAL CAR



Standard on 60 Railways for

Track Maintenance
Track Construction
Ash Disposal
Coal Hauling
Concrete Materials
Waste Handling
Excavated Materials
Hauling Cross Ties
Snow Disposal

Use These Labor Savers

Differential Crane Car
Clark Concrete Breaker
Differential 3-way Auto Truck Body
Differential Car Wheel Truck and Tractor

THE DIFFERENTIAL STEEL CAR CO., Findlay, O.

AMERICAN ELECTRICAL WORKS — AMELECTRIC — Wires and Cables — PHILLIPSDALE, R.I.

Reg. U. S. Pat. Office

AMELECTRIC PRODUCTS

BARE COPPER WIRE AND CABLE

TROLLEY WIRE

WEATHERPROOF WIRE AND CABLE

PAPER INSULATED UNDERGROUND CABLE

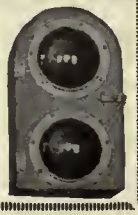
MAGNET WIRE

AMERICAN ELECTRICAL WORKS
PHILLIPSDALE, R. I.

Chicago, 20-32 West Randolph Street.
Cincinnati, Traction Bldg.: New York, 100 E. 42nd St.

NAUGLE POLES
WESTERN & NORTHERN CEDAR
NAUGLE POLE & TIE CO.
59 E. MADISON ST. CHICAGO ILL.
New York · Columbus · Kansas City · Spokane · Vancouver · Boston

Chapman
Automatic Signals
Charles N. Wood Co., Boston



WHAT HAVE YOU

FOR SALE
FOR RENT
FOR EXCHANGE ?

Up-to-date buyers in this industry watch the Second-Hand Equipment pages of this paper.

GOLD CAR HEATING & LIGHTING CO.
220 36th St., Brooklyn, N. Y.

ELECTRIC HEATERS WITH OPEN COIL OR ENCLOSED ELEMENTS
THERMOSTAT CONTROL—VENTILATORS
WRITE FOR NEW CATALOGUE

ELECTRICAL WIRES and CABLES

ROEBLING

John A. Roebling's Sons Co., Trenton, N.J.

NACHOD & UNITED STATES SIGNAL CO., INC.
LOUISVILLE, KY.
BLOCK SIGNALS
FOR
ELECTRIC RAILWAYS
HIGHWAY CROSSING SIGNALS



HUBBARD
Hubbard and COMPANY
PITTSBURGH OAKLAND CHICAGO

SAMSON SPOT WATERPROOFED TROLLEY CORD



Trade Mark Reg. U. S. Pat. Off.
Made of extra quality stock firmly braided and smoothly finished
Carefully inspected and guaranteed free from flaws.
Samples and information gladly sent.
SAMSON CORDAGE WORKS, BOSTON, MASS.

Fuses and Fuse Boxes
Columbia Machine Works
Consolidated Car Heat. Co.
General Electric Co.
Westinghouse E. & M. Co.

Gaskets
Westinghouse Tr. Br. Co.

Gas-Electric Drive for Buses
General Electric Co.

Gas Producers
Westinghouse E. & M. Co.

Gasoline
Texas Company

Gates, Car
Brill Co., The J. G.
Cincinnati Car Co.

Gear Blanks
Brill Co., The J. G.
Standard Steel Works Co.

Gear Cases
Chillingworth Mfg. Co.
Columbia Machine Works
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

Gears and Pinions
Bemis Car Truck Co.
Columbia Machine Works
Elec. Service Supplies Co.
General Electric Co.
Nat'l Ry. Appliance Co.
Tool Steel Gear & Pinion Co.

Generators
General Electric Co.
Westinghouse E. & M. Co.

Girder Rails
Bethlehem Steel Co.
Lorain Steel Co.

Gongs (See Bells and Gongs)

Greases (See Lubricants)
Texas Company

Grinders & Grinding Supplies
Railway Track-work Co.

Grinders, Portable Electric
Railway Track-work Co.

Grinders, Portable
Railway Track-work Co.

Grinding Bricks and Wheels
Railway Track-work Co.

Guard Rail Clamps
Ramapo Ajax Corp.

Guard Rails, Tee Rail and Manganese
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Guards, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.

Harps, Trolley
Columbia Machine Works
Elec. Service Supplies Co.
General Electric Co.
National Bearings Corp.
Star Brass Works

Headlights
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.

Headlining
Columbia Machine Works
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Heaters, Bus
Nichols-Lintern Co.

Heaters, Car (Electric)
Consolidated Car Heat. Co.
Gold Car Heat. & Ltg. Co.
Railway Utility Co.
Smith Heater Co., Peter

Heaters, Car, Hot Air and Water
Smith Heater Co., Peter

Heaters, Car, Stove
Smith Heater Co., Peter

Helmets, Welding
Railway Track-work Co.
Una Welding & Bonding Co.

Hoists and Lifts
Columbia Machine Works

Hose, Bridges
Ohio Brass Co.

Hose, Pneumatic
Westinghouse Tr. Br. Co.

Instruments, Measuring, Testing and Recording
American Steel & Wire Co.
General Electric Co.
Westinghouse E. & M. Co.

Insulating Cloth, Paper and Tape
General Electric Co.
Irvington Varnish & Ins. Co.
Mica Insulator Co.
Okonite Co.
Okonite-Callender Cable Co. Inc.
Westinghouse E. & M. Co.

Insulating Machinery
Amer. Ins. Machinery Co.

Insulating Silk
Irvington Varnish & Ins. Co.

Insulating Varnishes
Irvington Varnish and Insulating Co.

Insulation (See also Paints)
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Mica Insulator Co.
Okonite Co.
Okonite-Callender Cable Co. Inc.
Westinghouse E. & M. Co.

Insulation Slot
Irvington Varnish & Ins. Co.

Insulator Pins
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Insulators (See also Line Materials)
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Interior Side Linings
Haskelite Mfg. Corp.

Interurban Cars (See Cars, Passenger, Freight, Express, etc.)

Jacks (See also Hoists and Lifts)
Columbia Machine Works
Elec. Service Supplies Co.

Journal Boxes
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.

Lamps, Guards and Fixtures
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Lamps, Arc & Incandescent (See also Headlights)
General Electric Co.
Westinghouse E. & M. Co.

Lamps, Signal and Marker
Elec. Service Supplies Co.
Nichols-Lintern Co.

Lanterns, Classification
Nichols-Lintern Co.

Letter Boards
Cincinnati Car Co.
Haskelite Mfg. Corp.

Lighting Fixtures, Interior
Electric Service Supplies Co.

Lightning Protection
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Line Material (See also Brackets, Insulators, Wires, etc.)
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
National Bearings Corp.
Ohio Brass Co.
Westinghouse E. & M. Co.

Locking Spring Boxes
Wm. Wharton, Jr. & Co.

Locomotives, Electric
Cincinnati Car Co.
Cummings Car & Coach Co.
General Electric Co.
Westinghouse E. & M. Co.

Lubricating Engineers
Universal Lubricating Co.

Lubricants, Oil and Grease
Texas Company
Universal Lubricating Co.

Lumber (See Poles, Ties, etc.)

Machinery, Insulating
American Insulating Machinery Co.

Manganese Parts
Bemis Car Truck Co.

Manganese Steel Guard Rails
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Manganese Steel, Special Track Work
Bethlehem Steel Co.
Wm. Wharton, Jr. & Co.

Manganese Steel Switches, Frogs & Crossings
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Mica
Mica Insulator Co.

Mirrors, Inside and Outside
Cincinnati Car Co.

Motors, Generators, & Controls for Gas Electric Buses
General Electric Co.

Motor Buses (See Buses)

Motorman's Seats
Brill Co., The J. G.
Cincinnati Car Co.
Elec. Service Supplies Co.
Wood Co., Chas. N.

Motors, Electric
General Electric Co.
Westinghouse E. & M. Co.

Nuts and Bolts
Bemis Car Truck Co.
Cincinnati Car Co.
Hubbard & Co.

Oils (See Lubricants)
Texas Company

Oxyacetylene—See Cutting Apparatus

Oxygen
International Oxygen Co.

Packing
Westinghouse Tr. Brake Co.

Paints and Varnishes (Insulating)
Electric Service Supplies Co.
Irvington Varnish & Ins. Co.

Paints and Varnishes, Railway
Dixon Crucible Co.
Nat'l Ry. Appliance Co.

Pickups, Trolley Wire
Elec. Service Supplies Co.
Ohio Brass Co.

Pinion Pullers
Elec. Service Supplies Co.
Wood Co., Chas. N.

Pinions (See Gears)

Pins, Case Hardened, Wood and Iron
Bemis Car Truck Co.
Ohio Brass Co.
Westinghouse Tr. Brake Co.

Pipe Fittings
Standard Steel Works Co.
Westinghouse Tr. Brake Co.

Planers (See Machine Tools)

Plates for Tee Rail Switches
Ramapo Ajax Corp.

Pliers, Rubber Insulated
Elec. Service Sup. Co.

Plywood, Roofs, Headlinings, Floors, Interior Panels, Bulkheads, Truss Planks
Haskelite Mfg. Corp.

Pole Line Hardware
Bethlehem Steel Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.

Pole Reinforcing
Hubbard & Co.

Poles, Metal Street
Bates Expanded Street Truss Co.
Elec. Ry. Equipment Co.
Hubbard & Co.

Poles, Ties, Posts, Piling & Lumber
International Creosoting Co.
Naugle Pole & Tie Co.

Poles & Ties Treated
International Creosoting Co.

Poles, Trolley
Elec. Service Supplies Co.
National Tube Co.

Poles, Tubular Steel
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
National Tube Co.

Potheads
Okonite-Callender Cable Co.,
Okonite Co.

Power Saving Devices
National Ry. Appliance Co.

Pressings, Special Steel
Cincinnati Car Co.

Pressure Regulators
General Electric Co.
Westinghouse E. & M. Co.
Westinghouse Tr. Brake Co.

Punches, Ticket
International Register Co.
Wood Co., Chas. N.

Rail Braces & Fastenings
Ramapo Ajax Corp.

Rail Grinders (See Grinders)

Rail Joints
Carnegie Steel Co.

Rail Joints, Welded
Lorain Steel Co.

Rail Welding
Railway Track-work Co.
Una Welding & Bonding Co.

Rails, Steel
Carnegie Steel Co.
Electric Equipment Co.

Railway Safety Switches
Consolidated Car Heat. Co.
Westinghouse E. & M. Co.

Railway Welding (See Welding Processes)

Rattan
Brill Co., The J. G.
Cummings Car & Coach Co.
Elec. Service Supplies Co.
Hale-Kilburn Co.

Registers and Fittings
Brill Co., The J. G.
Cincinnati Car Co.
Elec. Service Supplies Co.
International Register Co.

Reinforcement, Concrete
Amer. Steel & Wire Co.
Bethlehem Steel Co.
Carnegie Steel Co.

Repair Shop Appliances (See also Coil Banding and Winding Machines)
Elec. Service Supplies Co.

Repair Work (See also Coils)
Westinghouse E. & M. Co.

Replacers, Car
Cincinnati Car Co.
Elec. Service Supplies Co.

Resistance, Wire and Tube
Westinghouse E. & M. Co.

Resistances
Consolidated Car Heat. Co.
General Electric Co.

Retrievers, Trolley (See Catchers and Retrievers, Trolley)

Rheostats
General Electric Co.
Westinghouse E. & M. Co.

Roofing, Car
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Roofs, Car and Bus
Haskelite Mfg. Corp.

Safety Control Devices
Safety Car Devices Co.

Sanders, Track
Brill Co., The J. G.
Elec. Service Supplies Co.
Nichols-Lintern Co.
Ohio Brass Co.

Sash Fixtures, Car
Brill Co., The J. G.
Cincinnati Car Co.

Sash Metal Car Window
Hale-Kilburn Co.

Scrapers, Track (See Cleaners and Scrapers, Track)

Screw Drivers, Rubber Insulated
Elec. Service Supplies Co.

Seating Materials
Brill Co., The J. G.
Haskelite Mfg. Corp.
Pantasote Co., Inc., The

Seats, Bus
Brill Co., The J. G.
Hale-Kilburn Co.

Seats, Car (See also Rattan)
Brill Co., The J. G.
Cincinnati Car Co.
Hale-Kilburn Co.

Second Hand Equipment
Electric Equipment Co.
Hyman Michaels Co.

Shades, Vestibule
Brill Co., The J. G.
Cincinnati Car Co.

Shovels
Brill Co., The J. G.
Hubbard & Co.

Shovels, Power
Brill Co., The J. G.

Signals, Car Starting
Consolidated Car Heating Co.
Elec. Service Supplies Co.
National Pneumatic Co.

Signal Systems, Block
Elec. Service Supplies Co.
Nachod and U. S. Signal Co., Inc.
Union Switch & Signal Co.
Wood Co., Chas. N.

Signal Systems, Highway Crossing
Nachod and U. S. Signal Co., Inc.
Wood Co., Chas. N.

Slack Adjusters (See Brake Adjusters)

Sleet Wheels and Cutters
Anderson Mfg. Co., A. & J. M.
Cincinnati Car Co.
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
National Bearings Corp.

Smokestacks, Car
Nichols-Lintern Co.

Snow-Plows, Sweepers and Brooms
Brill Co., The J. G.
Columbia Machine Works
Consolidated Car Fender Co.
Cummings Car & Coach Co.

Soldering and Brazing (See Welding Processes and Apparatus)

Special Adhesive Papers
Irvington Varnish & Ins. Co.

Special Trackwork
Bethlehem Steel Co.
Lorain Steel Co., The
Wm. Wharton, Jr. & Co.

Spikes
Amer. Steel & Wire Co.

Splicing Compounds
Westinghouse E. & M. Co.

Splicing Sleeves (See Clamps and Connectors)

Springs, Car and Truck
American Steel & Wire Co.
American Steel Foundries
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
Standard Steel Works Co.

Sprinklers, Track and Road
Brill Co., The J. G.
Cummings Car & Coach Co.

Steel and Steel Products
American Steel & Wire Co.
Carnegie Steel Co.

Steps, Car
Brill Co., The J. G.
Cincinnati Car Co.

Stokers, Mechanical
Babcock & Wilcox Co.
Westinghouse E. & M. Co.

Stop Signals
Nichols-Lintern Co.

Storage Batteries (See Batteries, Storage)

Strain, Insulators
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Strand
American Steel & Wire Co.
Roebling's Sons Co., J. A.

Street Cars, Passenger (See Cars, Passenger, Freight, Express, etc.)

Superheaters
Babcock & Wilcox Co.

Sweepers, Snow (See Snow Plows, Sweepers and Brooms)

Switch Stands and Fixtures
Ramapo Ajax Corp.

Switches
General Electric Co.

Switches, Selector
Nichols-Lintern Co.

(Continued on page 54)

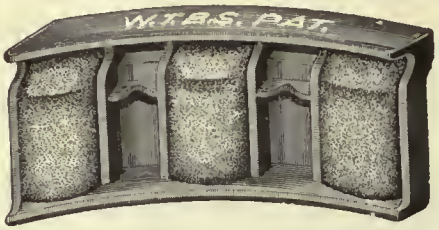
AIMco



SEND TODAY
for our Publication on
SAFETY
and
EFFICIENCY
in Electric Railway
Signals and
Crossing Bells

EST. 1855 AIMco INC. 1915
"American"
INSULATING
MACHINERY
COMPANY
REG. U.S. PAT. OFF.
521 Huntingdon St., Philadelphia, Pa.

A



Don't
Take
Cars Out
Of Service
To Turn
Worn
Wheels

THE WHEEL TRUING BRAKE SHOE does the work while your car is in service. Don't jeopardize your schedules by excessive pull-ins owing to wheel troubles. Use Wheel Truing Brake Shoes and keep the maximum equipment in service. They save time, labor and money.

WHEEL TRUING BRAKE SHOE CO.
Detroit, Mich.

B. A. HEGEMAN, Jr., President H. A. HEGEMAN, First Vice-Pres. and Treas.
F. T. SARGENT, Secretary W. C. PETERS, Vice-Pres. Sales and Engineering

National Railway Appliance Co.
Graybar Building, 420 Lexington Ave., New York

BRANCH OFFICES
Munsey Bldg., Washington, D. C. 100 Boylston St., Boston, Mass.
Hegeman-Castle Corporation, Railway Exchange Building, Chicago, Ill.

RAILWAY SUPPLIES

Tool Steel Gears and Pinions
Anglo-American Varnish Co., Varnishes, Enamels, etc.
National Hand Holds
Genesco Paint Oils
Dunham Hopper Door Device
Garland Ventilators
Walter Tractor Snow Plows
Feasible Drop Brake Staffs
Ft. Pitt Spring & Mfg. Co., Springs
Flaxlinum Insulation
Anderson Slack Adjusters
Economy Electric Devices Co. Power Saving and Inspection Meters
"Topeseald" Lamps
Bus Lighting Equipment
Cowdry Automotive Brake Testing Machine

Kalamazoo Trolley Wheels

The value of Kalamazoo Trolley Wheels and Harps has been demonstrated by large and small electric railway systems for a period of thirty years. Being exclusive manufacturers, with no other lines to maintain, it is through the high quality of our product that we merit the large patronage we now enjoy. With the assurance that you pay no premium for quality we will appreciate your inquiries.



THE STAR BRASS WORKS
KALAMAZOO, MICH., U. S. A.

INDUSTRIAL GASES

ACETYLENE
OXYGEN
I.O.C. SYSTEM
HYDROGEN
NITROGEN

Quick shipment and low prices also on cylinders, valves, torches, regulators and supplies.

International Oxygen Co., Main Offices: Newark, N. J.
Branches: New York Pittsburgh Toledo



FARE
BOXES for BUSES

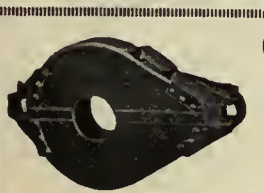
Let us tell you of this especially designed box for this class of service.

The Cleveland Fare Box Co.
4900 Lexington Ave., Cleveland, O.
Canadian Cleveland Fare Box Co., Ltd.
Preston, Ontario

COIN COUNTING And Sorting Machines CHANGE CARRIERS Tokens

Efficient Bus Heating
with
The N-L Venti-Duct Heater

THE NICHOLS-LINTERN CO.
7960 Lorain Ave. Cleveland, Ohio



CHILLINGWORTH
One-Piece Gear Cases

Seamless—Rivetless—Light Weight
Best for Service — Durability and Economy. *Write Us.*

Chillingwork Mfg. Co.
Jersey City, N. J.

H B LIFE GUARDS
PROVIDENCE FENDERS
Manufactured by
CONSOLIDATED CAR FENDER CO., PROVIDENCE, R. I.
General Sales Agents
WENDELL & MacDUFFIE CO., 110 E. 42nd St., N. Y. C.

EIGHT WORKS
RAMAPO-AJAX-ELLIOTT
HILLBURN, NEW YORK
NIAGARA FALLS, N.Y.
CHICAGO, ILLINOIS
EAST ST. LOUIS, ILL.
PUEBLO, COLORADO
SUPERIOR, WISCONSIN
LOS ANGELES, CAL.
NIAGARA FALLS, ONT. CANADA

Ramapo Ajax Corporation



RAMAPO AUTOMATIC
RETURN SWITCH STANDS
FOR PASSING SIDINGS
TEE RAIL SPECIAL WORK
MANGANESE WORK A SPECIALTY
SALES OFFICES AT ALL WORKS
Main Office, HILLBURN, N.Y.



STUCKI
SIDE
BEARINGS

A. STUCKI CO.
Oliver Bldg.
Pittsburgh, Pa.

ALPHABETICAL INDEX TO ADVERTISEMENTS

	Page
American Appraisal Co., The	44
American Brass Co., The	32
American Car Co.	55
American Electrical Works	51
American Insulating Machinery Co.	53
American Steel & Wire Co.	34
American Steel Foundries	8
Anaconda Copper Mining Co.	32
Anderson Mfg. Co., A. & J. M.	45
Asso. of Mfrs. Chilled Car Wheels	35
Babcock & Wilcox Co.	47
Bates Expanded Steel Truss Co.	47
Beeler Organization	46
Bemis Car Truck Co.	29
Bethlehem Steel Company	44
Bibbins, J. Rowland	46
Brill Co., The J. G.	56
Buchanan & Layng Corp.	47
Carnegie Steel Co.	33
Chillingworth Mfg. Co.	53
Cincinnati Car Co.	17
Cleveland Fare Box Co.	53
Collier, Inc., Barron G.	40
Columbia Machine Works & M. I. Co.	48
Consolidated Car Fender Co.	53
Consolidated Car Heating Co.	47
Cummings Car & Coach Co.	19
Day & Zimmermann, Inc.	46
Differential Steel Car Co., The	51
Drum & Co., A. L.	47
Earll, C. I.	45
Electric Equipment Co.	48-49
Electric Ry. Equipment Co.	51
Electric Service Supplies Co.	9
Firestone Tire & Rubber Co.	28
Faile & Co., E. H.	46
Ford, Bacon & Davis	46
"For Sale" Ads	48-49
General Electric Co.	22, Back Cover
Goodrich Rubber Co., The B. F.	25
Graham Brothers	20-21
Griffin Wheel Co.	43
Gold Car Heating & Ltg. Co.	51
Hale-Kilburn Co.	24
Haskelite Mfg. Corp.	54
"Help Wanted" Ads	48-49
Hemphill & Wells	46
Holst Englehardt W.	46
Hubbard & Co.	51
Hyman-Michaels Co.	48-49
International Crensoting Co.	38
International Oxygen Co.	53
International Register Co.	44
International Steel Tie Co., The	7
Irvington Varnish & Insulator Co.	47
Jackson, Walter	46
Jeandron, W. J.	43
Johnson Fare Box Co.	48
Kelker, DeLeuw & Co.	46
Kerite Ins. Wire & Cable Co.	45
Kuhlman Car Co.	55
LeCarbone Co.	43
Linn & Marshall, Inc.	46
Lorain Steel Co.	44
McClellan & Junkersfeld	46
Mica Insulator Co.	45
Motor Wheel Corp.	Front Cover
Nachod and United States Signal Co., Inc.	51
National Bearing Metals Corp.	43
National Brake Co.	23
National Pneumatic Co.	15
National Ry. Appliance Co.	53
National Tube Co.	37
Naugle Pole & Tie Co.	51
Nichols-Lintern Co., The	53
Oakite Products, Inc.	44
Ohio Brass Co.	5
Okonite-Callendar Cable Co., Inc., The	51
Okonite Co., The	51
Pantasote Co., The	43
Perey Mfg. Co., Inc.	47
Portland Cement Asso.	41
Positions Wanted and Vacant	48-49
Railway Track-work Co.	6
Railway Utility Co.	54
Ramapo Ajax Corp.	53
Richey, Albert S.	46
Roebling's Sons Co., John A.	51
Russell, Burdsall & Ward Bolt & Nut Co.	36
Safety Car Devices Co.	10
Samson Cordage Works	51
Sanderson & Porter	46
Searchlight Section	48-49
Smith Heater Co., Peter	47
Standard Steel Works Co.	31
Star Brass Works, The	53
Stevens & Wood, Inc.	46
Stone & Webster	46
Stucki Co., A.	53
Texas Co., The	30
Tool Steel Gear & Pinion Co., The	39
Una Welding & Bonding Co.	47
Union Switch & Signal Co.	18
Universal Lubricating Co., The	47
"Want" Ads	48-49
Wason Mfg. Co.	55
Westinghouse Elec. & Mfg. Co.	2, 4
Westinghouse Traction Brake Co.	16
Wharton, Wm., Jr. & Co., Inc.	44
"What and Where to Buy."	50-52-54
Wheel Truing Brake Shoe Co.	53
White Eng. Corp., The J. G.	46
Wish Service, The P. Edw.	47
Wood Co., Chas. N.	51
Yellow Truck & Coach Co.,	Insert 11-12-13-14

WHAT AND WHERE TO BUY—Continued from page 52

Switches and Switchboards
Consolidated Car Heating Co.
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

Switches, Tee Rail
Ramapo Ajax Corp.

Switches, Track (See Track Special Work)

Tampers, Tie
Railway Track-work Co.

Tapes and Cloths (See Insulating Cloth, Paper and Tape)

Tee Rail Special Track Work
Ramapo Ajax Corp.

Telephone and Telegraph Wire
American Steel & Wire Co.
J. A. Roebling's Sons Co.

Telephones and Parts
Elec. Service Supplies Co.

Testing Instruments (See Instruments, Electrical Measuring, Testing, etc.)

Thermostats
Consolidated Car Heating Co.
Gold Car Heat. & Ltg. Co.
Railway Utility Co.
Smith Heater Co., Peter

Ticket Choppers and Destroyers
Elec. Service Supplies Co.

Ties and Tie Rods, Steel
American Bridge Co.
Carnegie Steel Co.
International Steel Tie Co.

Ties, Wood Cross (See Poles, Ties, Posts, etc.)

Tires
Firestone Tire & Rubber Co.
Goodrich Tire & Rubber Co.

Tongue Switches
Wm. Wharton, Jr. & Co.

Tools, Track & Miscellaneous
Amer. Steel & Wire Co.
Columbia Machine Works
Elec. Service Supplies Co.
Hubbard & Co.
Railway Track-work Co.

Towers and Transmission Structures
Bates Expanded Steel Truss Co.
Westinghouse E. & M. Co.

Track Grinders
Railway Track-work Co.
Ramapo Ajax Corp

Track, Special Work
Columbia Machine Works
Ramapo Ajax Corp.

Trackless Trolley Cars
Brill Co., The J. G.

Transformers
General Electric Co.
Westinghouse E. & M. Co.

Treads, Safety Stair Car Steps
Cincinnati Car Co.

Tree Wire
Okonite Callender Cable Co.
Okonite Co.

Trolley Bases
Ohio Brass Co.
National Bearings Corp.
Westinghouse E. & M. Co.

Trolley Buses
Brill Co., The J. G.
General Electric Co.

Trolley Material, Overhead
Anderson Mfg. Co., A. & J. M.
Elec. Service Supplies Co.
General Electric Co.
National Bearings Corp.
Ohio Brass Co.
Westinghouse E. & M. Co.

Trolley Wheels (See Wheels, Trolley)

Trolley Wheel Bushings
National Bearings Corp.
Star Brass Works

Trolley Wire
American Brass Co.
Amer Electrical Works
Amer. Steel & Wire Co.
Anaconda Copper Min. Co.
Roebling's Sons Co., J. A.

Trucks, Car
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Cummings Car & Coach Co.

Truss Planks
Haskelite Mfg. Corp.
National Tube Co.

Tubing, Yellow & Black Flexible Varnishes
Irvington Varnish & Ins. Co.

Turbines, Steam
General Electric Co.
Westinghouse E. & M. Co.

Turnstiles
Elec. Service Supplies Co.
Perey Mfg. Co., Inc.

Turntables
Elec. Service Supplies Co.

Valves
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Varnished Papers & Silks
Irvington Varnish & Ins. Co.

Varnishes (See Paints, etc.)

Ventilators
National Ry. Appliance Co.

Ventilators, Car
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Heating Co.
Nichols-Linternn Co.
Railway Utility Co.

Vestibule Linings
Haskelite Mfg. Corp.

Welded Rail Joints
Lorain Steel Co.
Railway Trackwork Co.
Una Welding & Bonding Co.

Welders, Portable Electric
General Electric Co.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Welders, Rail Joint
General Electric Co.
Ohio Brass Co.
Railway Track-work Co.

Welding & Cutting Tools
International Oxygen Co.

Welding Processes and Apparatus
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Welding Steel
Railway Track-work Co.
Una Welding & Bonding Co.

Welding Wire
American Steel & Wire Co.
Railway Track-work Co.
Roebling's Sons Co., J. A.

Welding Wire and Rods
Railway Track-work Co.

Wheels, Car, Cast Iron
Ass'n of Mfrs. of Chilled Car Wheels
Griffin Wheel Co.

Wheels, Car, Steel & Steel Tired
American Steel Foundries
Bemis Car Truck Co.
Carnegie Steel Co.
Standard Steel Works Co.

Wheels, Motor
Motor Wheel Corp.

Wheels, Trolley
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
National Bearings Corp.
Star Brass Works

Wheels, Wrought Steel
Carnegie Steel Co.

Wheel Guards (See Fenders and Wheel Guards)

Wheel Grinders
Wheel Truing Brake Shoe Co.

Wheel Presses (See Machine Tools)

Whistles, Air
Ohio Brass Co.
Westinghouse E. & M. Co.
Westinghouse Traction Brake Co.

Window Guards and Fittings
Cincinnati Car Co.

Wire Rope
American Steel & Wire Co.
Roebling's Sons Co., J. A.

Wires and Cables
American Brass Co., The
Amer. Electrical Works
Amer. Steel & Wire Co.
Anaconda Copper Mining Co.
Kerite Ins. Wire & Cable Co.
Okonite Co.
Okonite-Callender Cable Co., Inc.
Roebling's Sons Co., J. A.
Westinghouse E. & M. Co.

RAILWAY UTILITY COMPANY
CAR COMFORT WITH HEATERS
UTILITY REGULATORS
VENTILATORS
2241-2247 Indiana St. Chicago, Ill.
Write for Catalogue
1328 Broadway New York, N. Y.

HASKELITE ROOFS
Haskelite Manufacturing Corporation,
133 West Washington Street, Chicago
PLYMETL SIDE PANELS



Simplicity!



Noise reduction
Smooth and comfortable riding
Quick in acceleration and deceleration
Attractive in appearance and comfort

Brill 1928 Model Electric Car

measures up to high standard of appearance

In keeping with the "1928" demand this most recent Brill accomplishment was primarily designed to attract passengers. That's why noise has been reduced by the use of W-N double reduction gear units and Brill external contracting drum brakes. That's why such important features as the Brill Bolster Guide, Graduated Spring System and Twin Links, developed in years of practical service, are embodied to provide that smooth and comfortable riding action necessary to any successful railway service. That's why provision is made for quick acceleration and deceleration to compete with other forms of transportation.

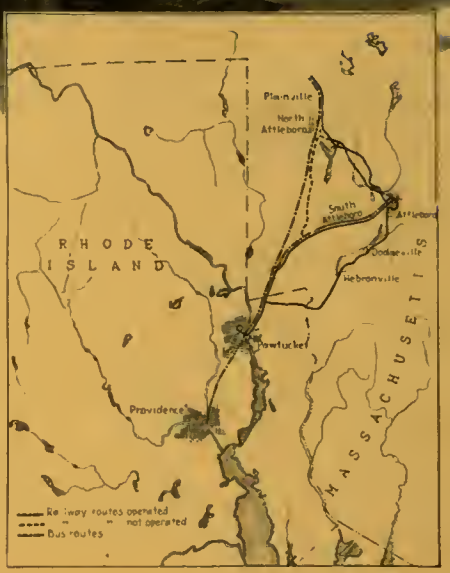
And that's why its appearance, inside and out, is dominated by that simplicity, beauty and richness of color, which creates the desire to ride. The public will take to the Brill 1928 Model Electric Car because it measures up in appearance to that present-day higher standard of living.

Write for Copy of Bulletin No. 319.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.
AMERICAN CAR CO. ST. LOUIS MO. — G.C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.



The reduced expenses, and often increased revenue, mean such a large annual return on the investment that modern cars soon pay for themselves—and then they go on earning more than the obsolete cars they replaced.



New light-weight cars help retain railway service for "the Attleboros"

The history of the Interstate Street Railway covering recent months is another story of the power of modernization to make railway operation pay.

This road operated at a loss, passed into receivership and was sold at auction. Then it purchased lighter, attractive cars, G-E equipped; began one-man operation; increased schedule speeds; reduced substation costs by the adoption of automatic control; and promoted public good will.

Savings made during three months' operation total more than $13,000 —an annual return of 65% on the new-car investment.

	Operating costs per car-mile for 3-month period during 1925		Reductions in operating costs per car-mile for accounts affected by the new cars	
	Old Cars	New Cars	Cents	Per cent
Way & Structures	4.10¢	2.38¢	—	—
Equipment	8.11	3.14	4.97¢	61%
Power	8.80	5.43	3.37	38
Conduct. Trans.	13.06	9.02	4.04	31
General & Misc.	3.52	5.93	—	—
Total	37.59¢	25.90¢	12.38¢	33%

General Electric equipment has been chosen for many of the recent outstanding, forward-looking car developments. It has helped to make many of the operating records which have established so conclusively the value of the modern light-weight car.

330-18

GENERAL ELECTRIC

ELECTRIC RAILWAY JOURNAL

cGraw-Hill Publishing Company, Inc. NOVEMBER 12, 1927 Twenty Cents per Cop

HOUSTON PUBLIC LIBRARY
HOUSTON, TEXAS



50 Mack Buses are operated by the County Transportation Company, subsidiary of the New York, Westchester and Boston Railroad.

These buses extend the service of this important railway through the exclusive residential districts of Westchester County.

Mack Trucks, Inc.
International Motor Company
25 Broadway, New York City



St. Louis

The City Surrounded by the United States

THE spirit of St. Louis has steadily and surely brought her up from the small trading post established on the west bank of the Mississippi in 1764 to the proud position she holds today.

It has been a spirit of solidity and conservatism, taking the utmost advantage of her strategic position on the inland waterways, in the center of the richest country in the world, in a rational way without speculation.

Panics have come and left St. Louis none the worse. Booms have given her a wide berth. And the reason is good business judgment—for St. Louis does not put all her eggs in one basket. Three thousand five hundred factories in two hundred and eleven different kinds of industry with only 8% of her labor in the largest are her insurance against depression in one branch of manufacture.

Eastern capitalists on visiting the city have been so amazed at the wide diversity of activities and manufacture that they have called her "the best balanced large city in America".

Among the products for which St. Louis is noted are raw furs in which she has been a leader since the beaver and buffalo days. With annual sales of over $300,000,000 she is fast overtaking Boston as a shoe center, and the largest drug factory has put St. Louis in the front rank in this industry.

St. Louis also has the largest individual plants in the world for the manufacture of twelve other products.

As a shipping center, St. Louis has solved the wasteful long-haul problem. Because of her central location, she is a dominating distributing center from which all markets can be reached on a competitive basis, including Europe—she ships from the center and not from the rim.

And the United Railways of St. Louis have been equally progressive in solving local transportation problems. With the true spirit of St. Louis they have forged steadily and surely forward, improving the service with the latest ideas and increasing the rolling stock with Westinghouse modern equipment.

Westinghouse Electric & Manufacturing Company
East Pittsburgh : : : : : Pennsylvania

1927

Westinghouse

X95557

MORRIS BUCK
Managing Editor

JOHN A. DEWHURST
Associate Editor

JOHN A MILLER, Jr.
Associate Editor

CLARENCE W SQUIER
Associate Editor

CARL W. STOCKS
Associate Editor

ELECTRIC RAILWAY JOURNAL

CHARLES GORDON, *Editor*

HENRY W. BLAKE
Senior Editor

GEORGE J. MacMURRAY
News Editor

O. W. JAMES, Jr.
Assistant Editor

PAUL WOOTON
Washington Correspondent

ALEX McCALLUM
Editorial Representative
London, England

Vol. 70
No. 20

CONTENTS

Pages
889-926

NOVEMBER 12, 1927

Editorials 889

Dorchester Rapid Transit Extension Completed 892
By E. L. LOCKMAN.
Former steam railroad right-of-way will be utilized by Boston Elevated Railway in part for rapid transit service and in part for high-speed trolley operation. Details of construction are given.

"Ask Me Another," as Practiced in Fort Worth, Tex 896

Logical Valuation for the Utilities 897
By WILLIAM A. PRENDERGAST.
Cost of reproduction urged as the fairest method of determining the rate base. The stockholder who takes the risk is entitled to the return from a prudent investment.

Many Ride-Selling Ideas Developed on Northern Texas Traction 900

Auto Bus Transportation Occupies Important Position in Minnesota 900

Good Service Has Paid on the South Shore Line 901
A rapid and reliable freight service has brought patronage and will be supplemented by motor tractors and flat cars for sections not reached by the railroad. Aggressive merchandising methods adopted.

Novel Features in Railway Substation 906

Maintenance Methods and Devices 907

New Equipment Available 909

Association Activities 910

Iowa Operators Discuss Rail and Bus Service 910

Freight Is Becoming a Major Source of Revenue 911
By C. F. DEGE.

American Association News 912

News of the Industry 914

Recent Bus Developments 919

Financial and Corporate 920

Book Reviews 922

Personal Mention 923

Manufactures and the Markets 924

A Safe Channel

RECENT floods have brought poignantly home to the American people the importance of keeping mighty bodies of water within bounds. Rivers harnessed are one of man's greatest allies; unloosed they bring disaster. To confine these currents in well-defined channels that may serve man to the highest degree and turn with power the wheels of industry requires the best engineering and mechanical skill.

Rumor is like the unleashed waters; facts like a swift and powerful stream between high banks. The JOURNAL, under the supervision of skilled editors, is kept a safe and broad channel of information that flows constantly to the industry carrying a wealth of news, statistics, and the summation of the fruits of research that do their part in turning the wheels of progress.

McGRAW-HILL PUBLISHING COMPANY, INC.
Tenth Avenue at 36th Street, New York, N. Y.
New York District Office, 285 Madison Ave.

JAMES H. McGRAW, President
JAMES H. McGRAW, JR., V.-P. and Treas.
MALCOLM MUIR, Vice-President
EDWARD J. MEHREN, Vice-President
MASON BRITTON, Vice-President
EDGAR KOBAK, Vice-President
C. H. THOMPSON, Secretary

WASHINGTON:
National Press Building
CHICAGO:
7 S. Dearborn Street
PHILADELPHIA:
1600 Arch St.
CLEVELAND:
Guardian Building
ST. LOUIS:
Bell Telephone Building
SAN FRANCISCO:
883 Mission Street
LONDON:
6 Bouverie Street, London, E. C. 4
Member Associated Business Papers, Inc.
Member Audit Bureau of Circulations

Cable Address: "Machinist, N. Y."

Publishers of
Engineering News-Record
American Machinist
Power
Chemical and Metallurgical Engineering
Coal Age
Coal Age News
Engineering and Mining Journal
Ingeniería Internacional
Bus Transportation
Electrical Railway Journal
Electrical World
Industrial Engineering
Electrical Merchandising
Radio Retailing
Construction Methods
Electrical West
(Published in San Francisco)
American Machinist—European Edition
(Published in London)

The annual subscription rate is $4 in the United States, Canada, Mexico, Alaska, Hawaii, Philippines, Porto Rico, Canal Zone, Honduras, Cuba, Nicaragua, Peru, Colombia, Bolivia, Dominican Republic, Panama, El Salvador, Argentina, Brazil, Spain, Uruguay, Costa Rica, Ecuador, Guatemala, Chile and Paraguay. Extra foreign postage to other countries $3 (total $7 or 29 shillings). Subscriptions may be sent to the New York office or to the London office. Single copies, postage prepaid to any part of the world, 20 cents.

Change of Address—When change of address is ordered the new and the old address must be given, notice to be received at least ten days before the change takes place.
Copyright, 1927, by McGraw-Hill Publishing Company, Inc.
Published weekly. Entered as second-class matter, June 23, 1908, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Printed in U. S. A.

Would you try to row a boat with one oar?



It can be done, but the inefficiency of steering against the turning effect of the one-sided force is obvious.

Similarly, balanced braking (the double shoe clasp type) is vastly superior to the single brake shoe rigging. The heavy braking load is equally balanced on opposite sides of the wheel. There is no shifting of the journal box bearing; no unbalanced load on truck frames and truck springs; less brake shoe wear; less journal box wear; fewer hot boxes; fewer slid-flat wheels; smoother and shorter stops; less train resistance in starting.

In other words, dozens of advantages—all making for economy and better transportation service.



AMERICAN MULTIPLE-UNIT
CLASP BRAKES



Balanced Braking

AMERICAN STEEL FOUNDRIES

NEW YORK CHICAGO ST. LOUIS

DOLLARS AND SENSE!





Totalized, the many possible small economies gained by using better line materials make a welcome addition to net earnings. Provide a greater net for the future by building permanence into overhead lines now.

ENDURANCE IS SERVICE INSURANCE

Hot dip galvanizing, recognized as the most effective rust-proofing method, is applied on all O-B Cross-Overs. Combined with Flecto Iron, tough and brittle-free, long, reliable service is assured.



Type C Insulated Cross-Over
Main insulating member of especially selected and treated hickory gives maximum strength and long life with minimum weight. Fibre runner pieces and bronze arcing tips are easily renewed in service. Cat. page 584.



Type E Live Adjustable Cross-Over
A correctly balanced design gives strength, light weight and long life. Wear is evenly distributed, avoiding replacement before maximum service is obtained. Pan and cross runners interlock and are held together without screws or bolts. Pull-off holes provided in compression ring. Cat. page 579.



Type DC Live Rigid Cross-Over
A liberal cross-section of metal, properly distributed, combines maximum strength with light weight. Runners cross in a diamond shaped section at center of pan. The trolley wheel rides across the pan on its groove, the flanges not touching the pan. Ample side clearance is provided for wheel flanges. Cat. page 582.

Quiet Crossings
for better, longer service

NOISE reduction is today acknowledged as one of the necessary and important steps in service betterment. Not alone because it means low operating and maintenance costs, but also because it results in more pleasing service to car riders. And certainly, noise inside the car—especially the resounding hammer blow of the trolley wheel at special work—is far more objectionable to riders than noises outside of the car.

O-B Cross-Overs are designed to minimize pounding, and also arcing, of trolley wheels. Their patented Cam Tip Approaches, Graduated Runners, and libéral clearances take the trolley wheel through the crossing smoothly and quietly. There is less vibration on the overhead, less wear on both trolley wire and wheel, and the number of line breaks is considerably reduced.

Other features, such as pull-off eyes, to facilitate alignment of adjacent wires; deflector bars, where necessary, to prevent catching of the trolley pole; and the use of strong, rust resisting, brittle-free O-B Flecto malleable iron, simplify installation and maintenance and insure longer life.

Ask your O-B salesman to arrange a trial installation. Or write directly to

Ohio Brass Company, Mansfield, Ohio
Dominion Insulator & Mfg. Co., Limited
Niagara Falls, Canada
734B

Ohio Brass Co.

PORCELAIN INSULATORS
LINE MATERIALS
RAIL BONDS
CAR EQUIPMENT
MINING MATERIALS
VALVES

SALES OFFICES: NEW YORK CHICAGO PHILADELPHIA PITTSBURGH CLEVELAND SAN FRANCISCO LOS ANGELES



The Westinghouse Tight-Lock Coupler

·····a modern coupler for modern service

With the adoption of train formation, rather than single car operation, to facilitate modern, quick, economic service, many traction properties have solved their coupling problems by the adoption of the Westinghouse Tight Lock Coupler.

In one operation, this modern coupler effects mechanical, electrical, and air connections . . . it is no longer necessary for crews to go between cars to make a coupling. Another feature of the Westinghouse Tight Lock Coupler is its ability to automatically take up slack caused by natural wear on the latches, thereby preventing relative motion between adjoining couplers. These advantages all contribute to the success of this modern coupler . . . Its adoption assures the ease, safety, and economy of single car control in multiple unit operation.



Westinghouse K-1-A Tight Lock Coupler

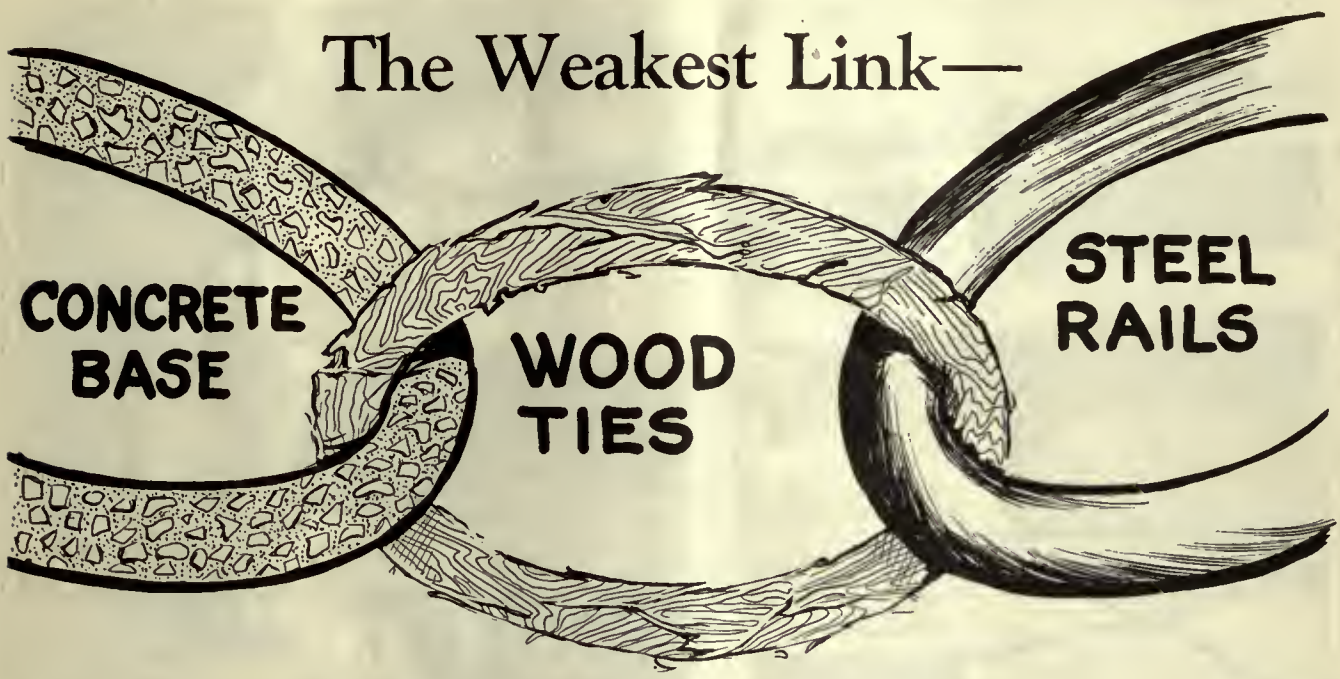
Tight Lock Couplers are promoting safety and economy in multiple unit traction service on many properties . . . they are furnished in three distinct types . . . the "H" for heavy, high speed trains; the "K-1-A" for medium and light weight cars; and the "C-3-A" for light cars, where the electric feature is not desired.

WESTINGHOUSE TRACTION BRAKE CO.
General Office and Works, WILMERDING, PA.

WESTINGHOUSE TRACTION BRAKES

2220

The Weakest Link—



or the Strongest?

NO track is better than its ties—no cars are better than the track that they must follow!

Build the best foundation—use the rail section most suited to your needs—run the newest, most modern cars—what happens when the steel wheels on steel rails go rolling over those wood ties?

The tie is the key to successful railway operation. Start now to build up a system that creates rider appeal—that builds profitable business.

Steel Twin Ties are the answer.

Write today for delivered prices for your 1928 track program.

THE INTERNATIONAL STEEL TIE CO.
Cleveland, Ohio

STEEL TWIN TIE TRACK
THE BASE OF MODERNIZATION



Underground, Overhead and on the Surface

Underground, overhead and on the surface the electric railway works to carry out its titanic daily task—the movement of a large portion of the city's population in the narrow confines of the rush hour.

In such circumstances *dependability* must be the first requirement of electric railway equipment. GARY WROUGHT STEEL WHEELS are designed, made and inspected with this requirement in mind. Our wheel engineers are at your service.



Illinois Steel Company

General Offices: 208 South La Salle Street
Chicago, Illinois

Golden Glow



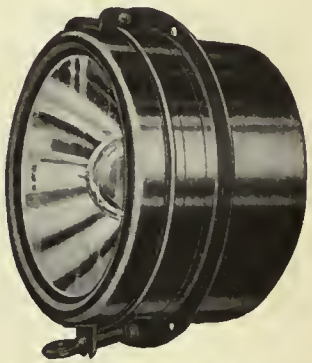
Type DG Golden Glow Headlight for city service. Being fitted with a Golden Glow prismatic reflector it illuminates a wide area adjacent to and for about 50 feet ahead of the car.

Better Schedules!

Better schedules and higher speed in night operation are direct advantages of using good headlights.

Golden Glow Headlights fulfill this need for more and better light. Their justly famous mirror-glass reflectors, which have been successfully introduced into every field of headlighting by this company, have set new high standards of headlight efficiency.

To get complete descriptions and illustrations of the various styles and sizes of Golden Glow Headlights, ask for our latest pamphlets.



Type R, Golden Glow Headlights are made in various types and fitted with either 9 inch or 12 inch diameter Golden Glow reflectors for suburban and interurban service.



Home office and plant at 17th & Cambria Sts., PHILADELPHIA; District offices at 230 So. Clark St., CHICAGO; 50 Church St., NEW YORK; Bessemer Bldg., Pittsburgh; 88 Broad St., Boston; General Motors Bldg., Detroit; 316 N. Washington Ave., Scranton; Canadian Agents, Lyman Tube & Supply Company, Ltd., Montreal, Toronto, Vancouver.

ELECTRIC SERVICE SUPPLIES CO.

MANUFACTURER OF RAILWAY, POWER AND INDUSTRIAL ELECTRICAL MATERIAL

WINDOWS DO MAKE A DIFFERENCE

Adding to Passenger Comfort

Edwards Metal Sash

ADMITTEDLY windows are put in cars and motor coaches for the passengers' comfort—so they can see out, to let light in, to let air in (or keep it out).

When the car or coach is equipped with Edwards Metal Sash, the windows perform these functions to perfection, and in utmost silence.

Our profusely illustrated catalog "S" lists many electric railway lines using Edwards Metal Sash, and tells the reasons why. Send for your copy.

TRADE PAOWNYC MARK
EDWARDS



O. M. EDWARDS CO.
New York Syracuse, New York Chicago
Canadian Representatives:
Lyman Tube & Supply Co., Ltd., Montreal and Toronto

VIRGINIA



NP

WATCH THESE FIGURES GROW

Richmond, Va. is one of the 42 cities which were operating cars equipped with treadle-exit doors prior to the 1st of January, 1927. 23 of these cities have since added to the number of treadle equipped cars in service. 12, in addition to Richmond, show an increase of more than 50%. There are now nearly 3,000 cars equipped with more than 5,000 treadle doors. Watch these figures grow.

NATIONAL PNEUMATIC COMPANY

Executive Office; Graybar Building, New York
General Works, Rahway, New Jersey

CHICAGO
518 McCormick Building

MANUFACTURED IN TORONTO, CANADA, BY
Railway & Power Engineering Corp., Ltd.

PHILADELPHIA
1010 Colonial Trust Building



Asbestos Ebony Switchboard 94th Street Sub-station, New York Edison Company, N. Y. C.

Never a flaw
—*never a metallic vein*

WE can truthfully say we've improved on Nature in making switchboard panels.

Compared to quarried materials Asbestos Ebony has greater dielectric strength, absolute freedom from flaws, greater shock resistance, and is much lighter in weight.

Every panel is monolithic in construction, with a deep black lustre that lasts through years of service.

Through— **Electrical Materials** FOR Utilities Jobber Contractor AND Dealer

JOHNS-MANVILLE

JOHNS-MANVILLE CORPORATION, MADISON AVE. AT 41ST ST., NEW YORK

BRANCHES IN ALL LARGE CITIES FOR CANADA: CANADIAN JOHNS-MANVILLE CO., LTD., TORONTO

SELLING POINTS FOR RIDE MERCHANTS



Capacity with Comfort; Speed with Safety; Beauty at Low Cost; and Lightweight with Strength,—these are the four features of Balanced Design which set a new standard in car building.

More Comfort—

more room for good-will - - - - - - - - -

Comfort,—real comfort,—in an electric railway car need not mean sacrifice of passenger-carrying capacity.

Cincinnati Curved Side Construction gives 7 inches extra inside width at the belt line, *without taking anything from hub and wagon clearances.*

Points such as this can be used to mighty good advantage in winning public goodwill for a new and better service. Cincinnati Balanced Lightweight Cars give you "something to talk about".

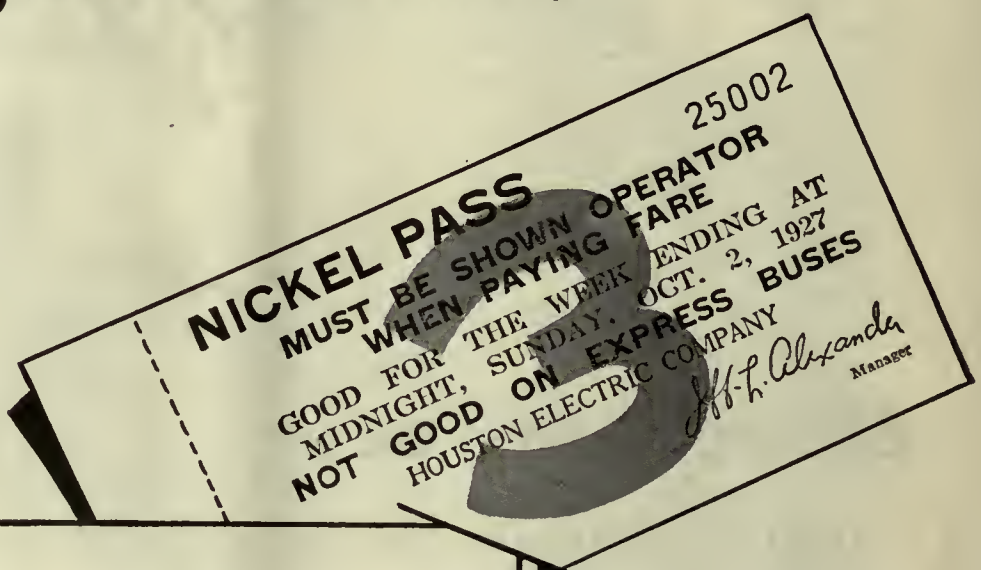
Write us.

CINCINNATI BALANCED LIGHTWEIGHT CARS

The Four Features of BALANCED DESIGN *are the Cardinal Points of Today's Demand*

THE NICKEL PASS

"A great development in fare collections"



It increases revenue by increasing the total number of rides sold per patron.

It reduces odd-cent change-making; and it encourages non-rush-hour riding.

THE principle of this plan is the selling of a weekly "Nickel Pass" to the regular rider at a price which slightly reduces the average fare paid by him *provided he rides more than the usual number of times per week.*

Speaking generally, the additional riding he does is done in odd hours.

The Nickel Pass is particularly adaptable for use on one-man cars.

We have prepared a graphic presentation of the Nickel Pass, based on actual operations of its use and exact computations of its revenue results under different base fares, and will be glad to forward you a copy on request.

Globe
TICKET COMPANY
112 North Twelfth Street
PHILADELPHIA
NEW YORK BOSTON BALTIMORE
CLEVELAND LOS ANGELES

Specialists for half a century

101 YEARS OF MANUFACTURING EXPERIENCE

Cane Webbing may be ordered through any H-W sales office.



No. 327-M

FOR INTERURBAN NEEDS

THIS Heywood-Wakefield seat is designed for the modern type of interurban service where comfort is now so important. It has been selected for both new cars and for replacement use.

It has deep, double spring cushions shaped to allow more leg freedom. Mechanism rails are set in. The individual backs are properly pitched for comfort.

Our car seating experts will be glad to help you decide on the best seating equipment for your needs. This service is free through any H-W sales office.



If you have not received a copy of our new Bus Seat Catalogue, write for it.

Heywood-Wakefield
REG. U.S. PAT. OFF.

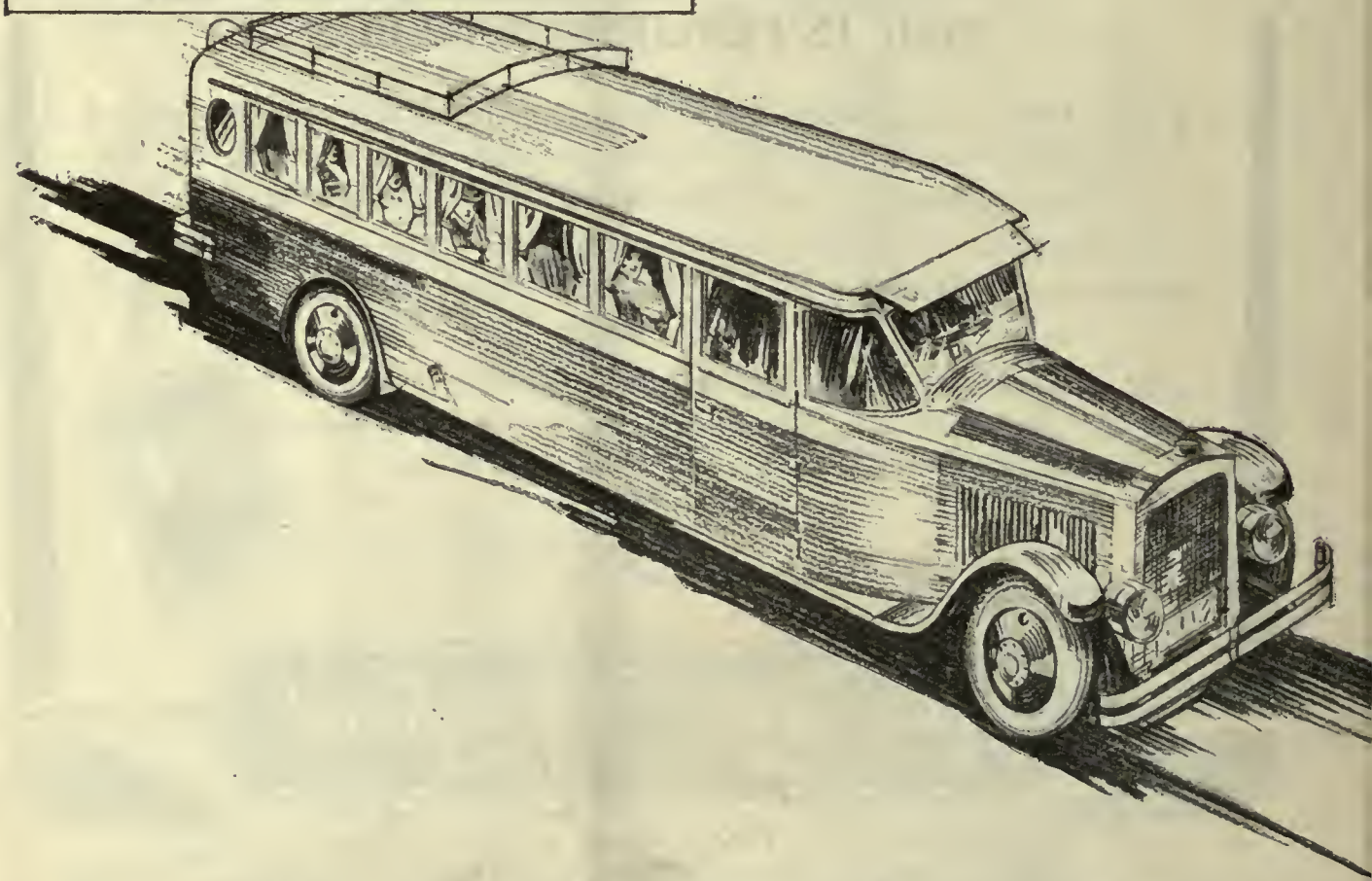


Heywood-Wakefield Co., Wakefield, Mass.; 516 West 34th St., New York, N. Y.; 439 Railway Exchange Bldg., Chicago, Ill. H. G. Cook, Hobart Bldg., San Francisco, Cal. The G. F. Cotter Supply Co., Houston, Texas. F. N. Grigg, 630 Louisiana Ave., Washington, D. C. The Railway & Power Engineering Corp., 133 Eastern Ave., Toronto; Montreal; Winnipeg, Canada.





An invitation to ride!



GENERAL

GENERAL ELECTRIC COMPANY, SCHENECTADY, NEW YORK

THE sale of transportation depends on the riding comfort that is offered.

This appeal must be embodied in the bus. Only a gas-electric can give that easy application of power, that gentle motion, that quick response to the guiding hand.

One operator reports that people constantly call up to learn the schedules of his G-E gas-electrics. They prefer to wait for one of these silent servants rather than ride in what they call "the old buses".

ELECTRIC DRIVE
for
GAS-ELECTRIC BUSES
AND TRUCKS

390-28

ELECTRIC

SALES OFFICES IN PRINCIPAL CITIES

1. *The main switchboard of the 1500-kw. station of the Key System Transit Company, Oakland, Calif.*
2. *The synchronous motor-generator set.*
3. *The concrete substation building.*



300% loads allowed and successfully handled

This automatic substation of the Key System Transit Company handles 300 per cent load until the temperature approaches a predetermined limit, then drops the load to 150 per cent and, if necessary, to 100 per cent. When cool, it again automatically takes the original load. Human operators could not be so accurate.

This station operates selectively from either of two 11,000-volt feeding circuits, automatically switching from one to the other if trouble occurs on either line. Supervision of operation from a remote point is also possible.

The removal of $11,000 worth of copper feeder cable and a decrease in feeder losses from 22 per cent to 9.6 per cent were immediate results. An 11 per cent increase in track capacity was also obtained.

This important station of the Key System Transit Company is a progressive departure from ordinary automatic substation practice. Its successful operation provides additional proof of General Electric's ability to design for the particular and peculiar demands so often encountered in railway service.

130-1

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN PRINCIPAL CITIES

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review
Published by McGraw-Hill Publishing Company, Inc.
CHARLES GORDON, *Editor*

Volume 70 New York, Saturday, November 12, 1927 *Number 20*

Nine Years Ago!

NINE years ago yesterday men's pulses beat in their throats. A delirium of joy possessed the world. The guns thundered no more! Eleven o'clock on Nov. 11, 1918, was chiseled on the order of American patriotism beside those other imperishable anniversaries that make us envy the dead "who loved and were loved" and who are now enshrined in the soil of France and their native land.

They left the workshop and the desk. They relinquished the most precious gift vouchsafed them by their Creator. They merged their personalities into a man-made hell that out of its vortex should come institutions that would create instead of destroy; that would serve mankind.

We cannot quicken their dust. Yet we can on each anniversary of their sacrifice renew our determination to hold high the torch that fell from their hands, to keep faith with them in order that they may sleep undisturbed in Flanders Fields.

Municipal Railway Bond Proposal Defeated in San Francisco

FOR the second time in less than six months the voters of San Francisco have rejected the proposal to authorize a bond issue of $4,600,000 to provide funds for the extension of the municipal railway. Moreover, the defeat was decisive. The measure lacked 8,807 votes of the required two-thirds to pass. Last June when a similar measure was defeated supporters of the proposal advanced the theory that the defeat was due to the light vote. There was no light vote this time. It was, as a matter of fact, the heaviest vote ever cast at a San Francisco municipal election.

The measure was not without its ardent advocates. The extensions to the municipal railway really are in the nature of a moral obligation on the part of the city. One of the proponents of the measure who pointed this out was none other than Senator Hiram W. Johnson. He spoke better than he knew when he said that San Francisco has a 5-cent car fare because the city owns a railway system. As the Senator saw it, San Francisco in its municipal railway is an object lesson to the entire nation. There is no fault to be found with the system there so far as the technical skill shown in the conduct of the railway is concerned, but that is an object lesson very different from the one the Senator from California had in mind. Moreover, there was in the Senator's statement evidence of a strange confusion of cause and effect. There is no need now to debate the issue. The two sides to the question were reviewed quite fully in comment which appeared in the issue of ELECTRIC RAILWAY JOURNAL for June 25. The important point is that it is extremely difficult not to consider as very significant the barrier which has been interposed by votes adverse to the bond issue registered twice within a period of less than six months.

A Permanent Place for the Street Car

EVIDENCE continues to accumulate that the street car has a place in the modern urban transportation scheme. No less an authority than the Kansas City *Times*, which has so often been a severe critic of the electric railways, recently said editorially, commenting on the Cleveland convention:

> Leaders of the electric railway industry are confident that they are demonstrating their ability to meet the changed conditions brought about by the advent of the private automobile. The first condition depends on the second. The continuance, to say nothing of the profitable operation of any type of transportation, is determined by the degree of service which it is prepared to render, by the readiness of those in charge of it to meet the public demand.
>
> There is evidence that the management of electric railways is becoming thoroughly alert to this contingency. . . . Two conditions seem to favor the street car as an important agency in city transportation. They are the comparatively moderate expense of its use and the fact that it is an aid to the relief of traffic congestion. . . . The two advantages of the street car, coupled with the possibility of constantly bettering its service, seem to give it a fair chance not only to survive but to operate on a reasonably profitable basis.

From an entirely different source, the Philadelphia *Evening Ledger*, comes additional confirmation of this viewpoint. Speaking editorially on the situation in South Jersey, it says:

> Engineers familiar with the general science of transportation have always known that no conceivable development in the design of motor buses will offer an adequate substitute for railroad service. In a lesser way the same rule applies to trolley cars. Street cars have a place in the scheme of city and interurban transit which even the best of the modern motor vehicles cannot fill. The residents of National Park, Westville and other communities south of Camden have been learning by this experience. Privately operated buses, less commodious and dependable than the street cars, were warmly welcomed in these towns, and a time came when trolleys were operating at a loss and had to be withdrawn. The various communities are now appealing to the Public Utilities Commission. They want the street cars restored.
>
> When all such differences are finally settled, it will be found that places exist in every scheme of intercity transit for trolleys, motor buses and railway trains. The thing to do is to find the place for each and keep it where it belongs under a permanent system of protected and regulated traffic.

From still another angle, there is the statement of C. E. Smith, the consulting engineer who made a report on the rapid transit situation in New York City, which appeared in abstract in this paper for Oct. 29. In discussing the New York surface cars he says: "Surface car lines are not obsolete and their business is not decreasing. On the other hand, they are becoming more and more important as a neighborhood convenience and necessity." And this is held to be true in a city where, according to J. P. Thomas, operating manager of the London Underground System, congestion in the streets exceeds anything anywhere in Europe!

Surely when disinterested observers are finding all this

good in the street cars, there must be something to it. It is now time for their detractors to show if they can how the congestion is to be lessened and the people carried to better advantage if the street cars are driven off the streets.

New England Railways Escape Serious Flood Damage

WITHIN the period of eight months a second large area of this country has suffered severe injury from destructive floods. Last spring the swollen Mississippi River was the cause of untold destruction along its valley. More recently the rivers of New England, particularly the Connecticut, have been on the rampage.

Damage to electric railway properties resulting from these floods has been less than might have been expected. The localities in the Mississippi Valley, where the greatest destruction occurred, were mostly agricultural communities. Comparatively few towns large enough to have electric railway service were hard hit. Similarly in Vermont, where the recent New England floods were at their worst, most of the towns affected had no street railway systems. Further south, in Massachusetts and Connecticut, the floods came down upon more populous communities and caused serious disruption of their transportation service. Elsewhere in this issue is an account of the difficulties encountered at Holyoke, Springfield, Hartford and other towns in that district. As the flood waters recede it appears that the permanent damage to physical property is slight. Suspension of service, however, has entailed large revenue losses. The railways spared no efforts to resume service, and have already made great strides in restoring normal conditions.

Feeding the Political Cat Another Gold Fish

PROPONENTS of the measure to enable the city of New York to borrow $300,000,000 beyond its present debt limit for the construction of new transit lines, particularly subways, are jubilant at the impressive victory which was scored for the proposal at the election on Nov. 8. Of course the prospects are pleasing to the party that is in power, but to the sober minded the thought occurs as to how much longer this stark madness on the part of the city can go on without its eventual and concomitant calamity. Only recently the Board of Estimate appropriated about $13,000,000 out of the budget for subway construction. The plan is to put in increasing amounts for the next four years. Contracts awarded for such subways now total $166,395,328 out of a probable $674,000,000.

The present Mayor of New York may be a little less vociferous than was his predecessor in office, but his sense of the eternal fitness of things is apparently no more acute than was Mr. Hylan's. Over the protests and warnings of Comptroller Berry the Board of Estimate, at his Honor's urging, continues to spend money like a drunken sailor. As that astute financial observer *Barron's* recently said, the city's figureheads, with here and there an exception, are plausible. And good politicians always are plausible. That is what makes them good politicians. Golconda is at their very doors. And they know it.

Administration of New York City is the largest public enterprise in the country, outside of the United States Treasury. The spoils are rich. And in politics, at least in New York City, to the victor belong the spoils. City bonds are exempt from federal and state income taxes, and the city's credit is therefore high. Somehow or other the revenues can be raised. If it is inadvisable to increase the tax rate, the assessment value can be boosted. It seems absurd, but it is a fact.

In 1917, the last year of the Mitchel administration, the city budget was $200,000,000. For 1928 the amount is $512,000,000. And Mr. Berry, the single administration thorn in the side of the spoilsmen, has warned of an impending budget of $1,000,000,000 in the not far distant future. But still the good old game of squander goes on, as *Barron's* has said, under "a tailor's model with a speaking attachment, wound up to say '5 cents' as often as necessary." As this same authority points out, if the annual cost of city administration were half what it is, the citizens of New York would be billions richer. But New York doesn't care. It appears to be ever ready to feed the political cat another gold fish.

A Death Warrant for Governmental Business

SINCE the ancient empire of the Pharaohs entered business, governments have regulated and in many instances have run businesses of a more or less public character, such as waterworks, ferries, gas, electric and railway enterprises, with the net result that they have made woeful failures in this line of activity. So writes Prof. Arthur S. Dewing of the Harvard Business School, in a concise and convincing exposé of "Why Government Fails in Business," appearing in a recent issue of the *Annalist*. The reasons given by this authority are: (1) Governments "endeavor to function without recognizing the rule in industry of profit"; (2) the ultimate test of the value of governmental operation rests with its ability to meet competition in commodities delivered to the ultimate consumer for services rendered; (3) profits represent a negative cost in that without profits the ultimate cost of goods produced or services rendered is greater than with profits; (4) unlike private enterprises, the directing heads of government businesses "carry on" whether the enterprises are failures or successes.

What is more important than these blunders, Professor Dewing sees the melancholy and deceitful fact that government business undertakings—premised upon no profits—are conducted with increased cost by reason not only of inefficient management, but because high real costs are masqueraded as low apparent costs, with the result that some form of taxation absorbs the slack. Also, most governmental enterprises are planned for immediate needs and not designed on a large capital investment that will reach forward over the longest stretches of time.

From the standpoint of fact and theory, Professor Dewing's analysis should be the death warrant of governmental business. Such enterprises habitually are economically unsound and present one of the most dangerous stumbling blocks to the march of progress. No industry realizes this more than the utilities, and most particularly the railways, which in several instances have been throttled by such competition. Now is the time to support the United States Chamber of Commerce's dictum that our government should retire permanently from business and let private enterprise march forward to greater achievements and reduce costs of the ultimate consumer. Which shall we have—communistic theories and socialistic failures, or sound business administration in which producer and consumer alike share the benefits? The foundations of our country rest in the decentralization of government.

The Jitney to Go in Detroit

DETROIT has won out over the jitneys at last. The victory has been a long time coming, but it was well deserved. The fight has lasted more than four years. The legal points at issue were made plain in the article in the JOURNAL for Oct. 22. It would seem that the matter has been defined by the courts in a manner sufficiently clear so that a quietus has been sounded on any attempt at appeal. The course of the direct action that will be taken by the city against the jitney has not been decided, but it is not unreasonable to suppose that the city will proceed against the jitneys no less militantly than it did in the first instance and on a plan fully as wide in its application as was the original one.

It seems incredible at this late day, when the matter has become a thing of the past almost everywhere else, that the jitney remained an issue in Detroit, but there were special reasons why this was so, reasons that did not govern elsewhere. With them there is no concern at this time. The question of the removal of the jitneys in Detroit has passed from a speculative one to one of fact, one of how now best to proceed. That is the work upon which the city officials are now engaged. Everywhere else that it appeared the jitney was a pest. It was no less so in Detroit, in which city it is estimated these usurpers carried 35,000 passengers a day, the great majority of whom should now become patrons of the cars or buses of the City Department of Street Railways. The jitneys in Detroit performed no function that the regularly organized railway and bus systems there cannot perform and no service that these systems are not prepared to perform, judging from the willingness so to do as demonstrated in the past.

Learn Your Company

"PEOPLE die of many things, but few from possessing too much knowledge. So also a number of persons fail to get ahead in their chosen business, but few because they know too much about it." These two sentences from the opening paragraph of an editorial in the *I.S.C. News,* published by the Indiana Service Corporation, are worthy of much thought by those who are striving to improve service and attain *finesse* in supertransportation.

How many times a day does the average passenger hear: "I do not know;" "I am not familiar with that part of the system;" "I've never been on that run," and a hundred other negative answers that reveal a total lack of familiarity with the company operation.

Like charity, information should begin at home. Nine times out of ten, it is not a lack of interest on the part of the employee in company affairs, but rather his company's lack of interest in a plan for instructing him in these matters. If it is his company's policy to "tell him" *he* will tell the public. A sentry on duty represents the might, and assumes the entire responsibility for the safety of the army in which he is enrolled. At one time or another every employee is in this rôle. If he is forewarned he is forearmed to combat adverse public opinion and ameliorate the traveler's difficulties. In short, in the words of the editorial just referred to, "an employee of the Indiana Service Corporation" (and any public utility), "who knows its size, its scope and business objective, is not only in a better position to answer the questions of the general public concerning this company, but is also in a much better way able to appreciate the company's problems and aid in their solution."

In this pronouncement there is a lesson to be learned by every public utility. The American being of a most inquisitive nature nothing is more appreciated than full, concise and reliable information. It is the open sesame to a full fare box and to a contended and cemented corporate family. The little editorial "Learn Your Company" is worthy of nation-wide distribution.

Research Takes on a New Significance

RESEARCH was invested with a new significance by Edward J. Mehren, vice-president of the McGraw-Hill Publishing Company, Inc., in an address recently made before the Chicago Association of Commerce. After presenting an exposition of its great value as one of the long-term guarantees of prosperity, he epitomized the situation as follows: "I hold out to you a promise—future industrial success—if you employ research, and I hold out a threat—industrial lameness and decay—if you neglect it."

Nowhere will this utterance strike a more responsive chord than in the hearts of the leaders of the transportation industry. Modern transportation is built upon research, and its continued progress demands further research without thought of cessation. It is research that developed the steam locomotive, the electric car, the gasoline automobile and its child the motor bus. It is research that has made it possible for the industry to promote speed with safety. It is research that has made it possible for one man to do the work of two in the transportation department, in the shop and on the track.

This last element, the reduction in man-power needed to perform a certain task, is shown by Mr. Mehren to be the greatest factor in our present material prosperity. The last United States census of manufactures showed that the volume of our manufactured goods in 1925 was 2¾ times that of 1899, but that the number of men employed was only 1.8 times as great. In other words, each man now produces 50 per cent more than he did in 1899. The reason is that we now use 3½ times as much power.

As a result of this greater productivity, there has been developed a higher standard of living for the individual, and these men thrown off as surplus labor by the older industries have gone into new industries and are making products undreamed of in 1899. This important phenomenon is at the bottom of our prosperity. If we understand how it occurred and what has made it possible we shall know some of the long-time guarantees of prosperity.

Back of the immediate and commercial types of research there must be another type of research, deeper in character, concerned with pushing back the boundaries of the unknown. On the results of this deeper type of research is built all of the great development that has made for the progress of the world since history began. Investigations of this type cannot be controlled. It is not possible to know beforehand what the result may be. It must suffice the investigator to know that there should be a result, either positive or negative. This type of research is to industry what the telescope is to the astronomer. The field is limitless.

Mr. Mehren's conclusion, "It is the responsibility of every American business executive to give generous support to cost reduction efforts and to industrial and scientific research," will undoubtedly be subscribed to by every far-seeing executive in the electric railway industry.



The surface cars loop at the principal rapid transit stations so as to provide for a convenient transfer

Dorchester Rapid Transit Extension Completed*

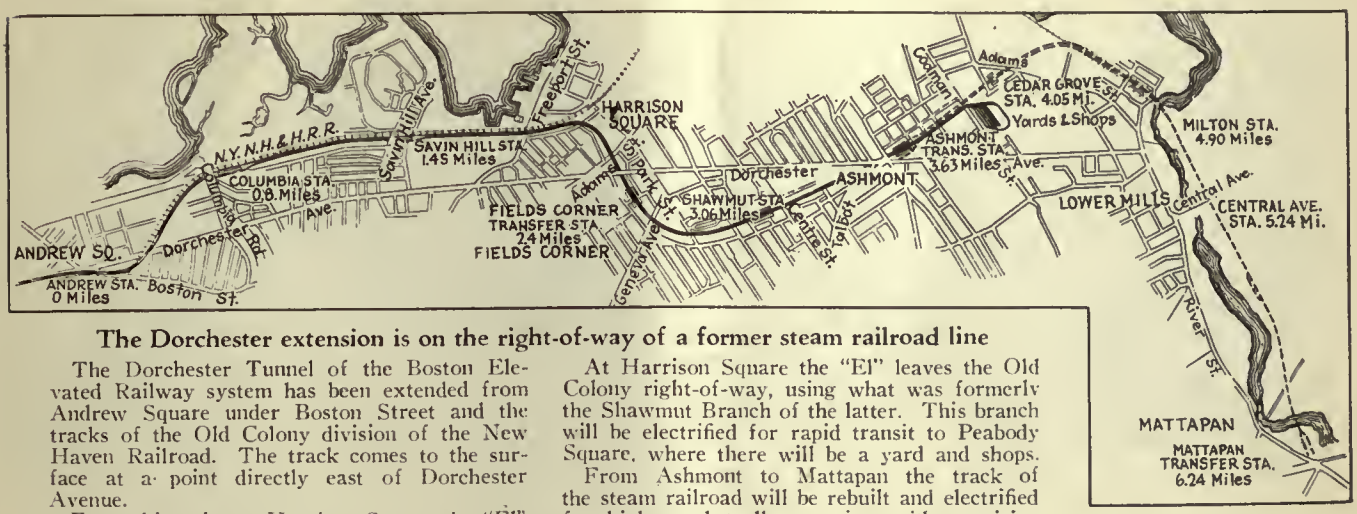
By E. L. Lockman
Assistant to the Superintendent of Maintenance
Boston Elevated Railway

Former steam railroad right-of-way will be utilized by Boston Elevated Railway in part for rapid transit service and in part for high-speed trolley operation. Details of construction are given

PREVIOUS to 1923 the residents of the Dorchester district of Boston had for several years urged the necessity of improved transportation facilities. It was suggested, among other things, that the Cambridge-Dorchester tunnel be extended to Meeting House Hill and possibly beyond that point. During various discussions the proposition of using one or more of the branch lines of the New Haven Railroad was advanced by Charles A. Ufford. The Department of Public Utilities and the Transit Department of the city of Boston, acting as a joint board in 1922, reported to the Legislature a comprehensive rapid transit system for the Dorchester district. On May 25, 1923, Governor Cox approved "An Act for the Extension of Rapid Transit Facilities in the Dorchester District of the City of Boston." This act was accepted by the City Council and approved by the Mayor of Boston on Sept. 12, 1923. After surveys and estimates had been made, a plan acceptable to those interested and the Boston Elevated Railway was approved.

The Shawmut Branch, extending from the main line of the Boston Division of the New Haven Railroad at Harrison Square to Milton and Mattapan, a distance of approximately 4.25 miles, with double track to Milton and then single track to Mattapan, was purchased by the city from the New Haven Railroad. In order to connect the existing Dorchester Tunnel of the Boston Elevated Railway system with the Shawmut Branch it was necessary to extend the tunnel from Andrew Square terminal under the New Haven tracks and under Boston

*Abstract of a paper presented at a meeting of the New England Street Railway Club, Boston, Mass., Oct. 27.



The Dorchester extension is on the right-of-way of a former steam railroad line

The Dorchester Tunnel of the Boston Elevated Railway system has been extended from Andrew Square under Boston Street and the tracks of the Old Colony division of the New Haven Railroad. The track comes to the surface at a point directly east of Dorchester Avenue.

From this point to Harrison Square the "El" tracks have been constructed on the west side of the right-of-way of the New Haven. This necessitated the relocation by the steam railroad of its own tracks for a distance of about 4,500 ft. between Columbia Avenue and Savin Hill on the easterly side of the railroad property.

At Harrison Square the "El" leaves the Old Colony right-of-way, using what was formerly the Shawmut Branch of the latter. This branch will be electrified for rapid transit to Peabody Square, where there will be a yard and shops.

From Ashmont to Mattapan the track of the steam railroad will be rebuilt and electrified for high-speed trolley service, with provision for convenient passenger interchange at Ashmont.

The completion of this project will add more than 6½ rapid-transit route-miles to the system, including more than 2½ miles of high-speed trolley route on private right-of-way.

Street, then curving to the left under Dorchester Avenue and coming to the surface beyond Dorchester Avenue parallel with the railroad tracks. From this point to Harrison Square the Transit Department was obliged to purchase additional land and move the four tracks of the New Haven Railroad to the east in order to provide a two-track right-of-way 35 ft. in width for rapid transit purposes.

The act provided that the extension of the Dorchester Tunnel was to be equipped by the railway in the same manner as all subways and tunnels previously built and leased. For the balance of the Dorchester rapid transit extension the equipment, except rolling stock, was to be provided by the city. By mutual agreement it was decided that all connections with the rapid transit extension occurring within public highways were to be installed and owned by the railway. These connections included trolley tracks, special work, trolley wire, poles, feeders, conduits, etc.

When it came to the proposition of building tracks and installing signal and power apparatus, the Transit Department felt that this work could be done best by the Boston Elevated Railway, as that company had much greater experience than any available contractor. The act provided that the work could be let without competitive bids and a contract was made with the railway covering the installation at cost plus an allowance of not more than 10 per cent for engineering, overhead, etc.

Track Is Solidly Constructed

Material required to equip the extension from Andrew Square to Fields Corner included 29,016 tons of ballast, 14,229 6x8-in. hard pine ties, 58,269 ft. of 85-lb. A.S.C.E. rail for the track and 24,874 ft. of the same section for the third rail, 14,000 ft. of special guard rail, 74,369 screw spikes, 20,626 tie plates and 60,250 malleable castings.

The track is constructed according to the Boston Elevated Railway standard for third rail operation. The running rails are mounted on rolled steel tie plates and





At left, section of track south of Cambridge-Dorchester tunnel. At right, approach to Savin Hill station, showing headhouse on the viaduct. Tracks of the N. Y., N. H. & H. R.R. are on the left

fastened to the wood ties with screw spikes. The ballast is crushed stone. The third rail is of the same section as the running rail but is rolled under different chemical specification. All curves are protected with Boston Elevated Railway special guard rail, and in addition a safety guard is placed on all fills and on all bridges.

The tracks are on 13-ft. centers on tangents and slightly more on curves, leaving on either side within the 35-ft. right-of-way ample room for signals, conduits, etc. The roadbed or sub-grade was first rolled with a steam roller and the ballast up to the bottom of the ties was delivered by motor truck. The minimum depth of the ballast under the ties is approximately 12 in. The ties are 8 ft. and 9 ft. 3 in. in length, spaced on approximately 2-ft. centers, the longer ties being used for supporting the third rail.

After the rails and ties were in place ballast for tamping purposes was delivered by car. Compressed air tie tampers were used for surfacing the track. The ballast



Portion of private right-of-way of Dorchester rapid transit extension

is dressed off level with the ties and on the outside of each track it is sloped off to the level of a footwalk about 2 ft. below the top of the rail. This footwalk is approximately 2 ft. in width and dressed off with peastone. It was provided for the safety of inspectors and track walkers. Footwalks are also provided across all bridges. Where the tracks are on a fill the banks are dressed off and seeded in order to improve the appearance and prevent erosion.

The entire line is block signaled, the signals being of the three-colored light type and controlled by alternating-current track circuits. One rail of each track is used for this purpose. There are 30 blocks of an average length of 8,000 ft. Each signal is equipped with an electric automatic stop to prevent a train passing a signal indicating "danger." The temporary interlocking at Fields Corner station is of the electro-pneumatic type with a.c. control. The block signals and interlocking equipment were furnished by the Union Switch & Signal Company.

The entire length of the rapid transit right-of-way is protected by a chain link fence 6 ft. in height topped with three strands of barbed wire in order to prevent trespassers entering the right-of-way and coming in contact with the third rail or trains, which will be operated on frequent headway. To prevent possibility of accidents this fence has been grounded in several places, as anything coming in contact with the third rail and fence would charge the entire fence for a long distance. The length of the fence including both sides, together with auxiliary fences at certain stations, is 32,070 ft. and it was necessary to provide 3,207 foundations with a concrete beam between foundations, requiring a total of approximately 2,000 cu.yd. of concrete.

Stations

The contracts for the passenger stations were let separately from the contracts for the right-of-way. The equipment of the stations will be provided jointly by the Transit Department and the Boston Elevated Railway. The passenger stations at Columbia Road and Savin Hill are way stations of the island type. Taking into consideration that they are out-of-door stations, they approximate as nearly as possible the best type of subway or underground station. The construction is substantial and entirely fireproof.

At each station the entrance building or headhouse is located on the sidewalk level at the intown end of the station. The headhouse is provided with wide doorways leading into an area where there is located the apparatus for collecting fares, making change, exit turnstiles, etc. Beyond the fare collecting barrier a double flight of stairs used for entrance and exit lead to the platform below. Under the stairs suitable toilets, closets, etc., are furnished. The platform is located between the tracks and is constructed of reinforced concrete. A canopy covers its entire length and is slightly higher than the roofs of the cars. The stations are 300 ft. long and provisions have been made for a future extension of 135 ft. to allow for the operation of six-car trains.

Fields Corner station, the third on the extension, is 2.4 miles from Andrew Square and will be the temporary terminus of the rapid transit trains pending the completion of the extension and terminal at Ashmont. At this location the Transit Department and the Boston Elevated Railway have developed a modern station and terminal for the interchange of passengers between rapid transit trains, trolley cars and buses. This station, with approaches, covers an area of 6.8 acres and is located a short distance north of the railway's building, carhouse and yard. The layout is an improvement over the older type of terminal in that it provides for direct interchange of passengers between trolley cars and rapid transit trains on the same level. The trolley cars reach the upper level by inclines having a grade of not more than 5 per cent.

The platforms are covered by a building 300 ft. in length by 135 ft. in width of steel and reinforced concrete construction with a steel and wood roof. The rapid transit platforms are long enough at the present time to accommodate four-car trains, but provision has been made for extending the platforms 135 ft. when six-car trains are operated.

The rapid transit tracks pass through the approximate center of the station with platforms on either side. There are two tracks for trolley cars on the outbound platform and one track on the inbound platform paralleling the rapid transit tracks and flush with the platforms.

The platform between the trolley cars and rapid transit track is 33 ft. in width, divided into two parts. The "pay-leave" area holds four cars where trolley car





Fields Corner transfer station for connecting lines. Illustration at left shows the bus and street passageway

passengers not having previously paid their fares will do so before entering the rapid transit platform. A "pay-enter" area for three cars is provided for the convenience of passengers who have previously paid their fares and wish to continue their journey on the trolley cars.

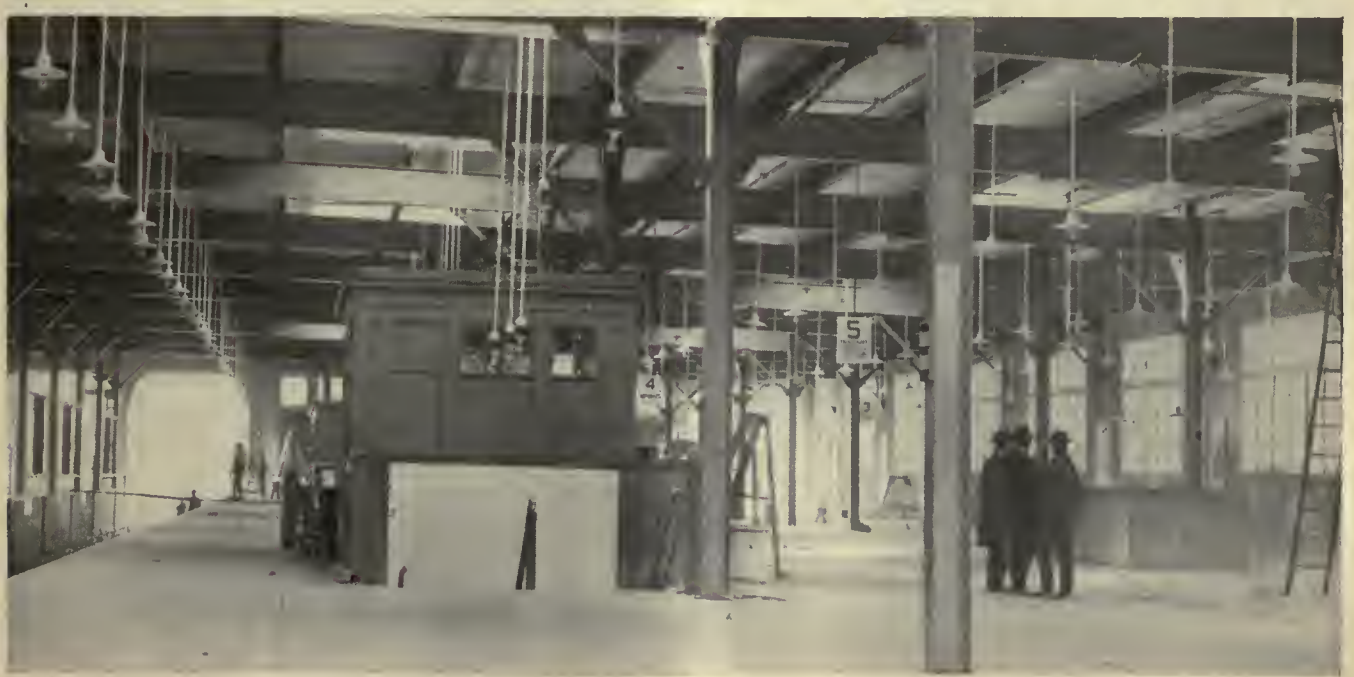
There is a 20-ft. busway through the station at the street level. Buses enter from the Dorchester Avenue side and pass out of the station at Geneva Avenue. The bus platform is 14 ft. in width and is divided transversely into two parts. The "pay-leave" area has a capacity of six buses. Passengers leave the buses here, pass through a barrier and pay their fare before entering the station to take either the trolley cars or rapid transit trains. The buses then make an additional stop in the "pay-enter" area, holding six buses, where passengers who have previously paid their fares take the buses.

Entrances and exits are provided at the street level. The main fare-collecting unit is located on the upper level between the inbound rapid transit tracks and the surface tracks. Fare collecting units are also located on the bus platform at the Charles Street entrance to the station. A total of eleven General Electric automatic passimeters and five Langslow passimeters are used in the various fare-collecting units.

The color scheme of the station differs from that used in the subway tunnel stations, where the trim around the white tile or plaster walls is a different color at each station. At all three stations the color of the roof supports, waiting rooms, booths, etc., is green, stippled with black, which is very effective.

Between the area occupied by the rapid transit station and the railway's property was a tract of land of sufficient size to permit the erection of a 100-car bus garage. At the request of the railway the Transit Department purchased this property, which with the rapid transit station and the railway's property gives an area of approximately 10 acres and provides for a complete operating plant of rapid transit trains, trolley cars and buses. The site for the bus garage is now being prepared; not all of the buildings have as yet been removed. One unit will be built at this time having an open floor area of 20,000 sq.ft. with a capacity of 56 buses. A central heating plant is also to be installed for heating the garage and waiting rooms in the station.

South of Fields Corner station the tracks extend for a sufficient distance to provide storage yard and operating tracks. A temporary double crossover has been installed for turning back trains. The crossover with



Transfer platform of Fields Corner station. Fences and passimeters will insure payment of rapid transit fares

necessary signals for governing the train movements will be controlled from an electro-pneumatic interlocking plant located in a temporary wooden tower just south of the station.

Between Park Street and Peabody Square, a distance of 4,150 ft., there is a covered section or subway. It was first intended to build this section in an open cut providing substantial retaining walls on either side and abolishing grade crossings at five streets. It was found, however, that the retaining walls would have to be of very heavy construction and the Transit Department and the railway engineers arrived at the same conclusion at practically the same time; that is, it would be fully as cheap to build a subway with a light roof construction and that the operating conditions would be much better in a subway than in an open cut, particularly on account of the probability of the cut filling with snow during heavy storms.

Shawmut station, 3.06 miles from Andrew Square, between Mather Street and Centre Street, will be of the subway type with separate platforms for each track; the platforms will be 435 ft. in length by 12 ft. wide. In this case it was found advisable to build the platform for the length necessary for six-car trains, but only 300 ft., to accommodate four-car trains, will be equipped. The entrance building or headhouse will be located in the covered section over the station platforms.

Ashmont terminal, 3.6 miles from Andrew Square, will be located just south of Peabody Square at the approximate location of the Ashmont station of the New Haven Railroad and will be the terminal for rapid transit trains and high-speed trolley line from Mattapan and Milton. There will also be local trolley track connections as well as ample capacity for buses.

The Ashmont terminal will also be of the one level type, in so far as trolley cars and rapid transit trains are concerned, the platforms between them being at the same level. The building covering the station platforms will be 300 ft. in length by 166 ft. in width, constructed of reinforced concrete, with roof of steel and wood. As at Fields Corner, the rapid transit tracks pass through approximately the center of the station, the tracks being about 4 ft. below the platform level.

All trolley cars enter the station from the south of the station building, passing over the rapid transit tracks on a concrete viaduct. There is one in-town trolley track next to the east wall of the station, having a capacity of six cars. Between this track and the in-town rapid transit track is a platform 30 ft. in width, where the main fare-collecting unit will be located.

After discharging passengers, the trolley cars will pass out of the station and over the rapid transit tracks by means of a concrete viaduct north of the station building and re-enter the station on the west side, where there are three tracks, having a total capacity of fifteen trolley cars, with ample platform between the outbound rapid transit track and the nearest trolley track and suitable platforms between each pair of trolley tracks. Cars that enter the station from the south may proceed north on Dorchester Avenue, without returning through the station.

The high-speed trolley cars will enter the station from the south on the in-town track previously described, and these cars will return over the reverse route as described above, picking up their passengers on the outbound side of the station, reaching the high-speed trolley track by means of the concrete viaduct south of the station previously described.

At this station the busway is located at approximately the same height as the roof covering the platforms. In designing the station the Transit Department took advantage of the fact that rapid transit tracks are considerably below the level of Dorchester Avenue and Peabody Square. The buses will enter the station from Dorchester Avenue on a slight upgrade, reaching the bus platform which is parallel to the rapid transit tracks. The total length of the bus platform is 330 ft. x 12 ft. wide. The busway itself is 20 ft. wide, and has a capacity of eleven buses on the loading and unloading platforms. The buses will leave the station on a slight descending grade, reaching Dorchester Avenue near Peabody Square.

Passengers leaving buses will have ready access to either the rapid transit or trolley car platform by means of a passageway at the roof level and stairways to the platforms. Fares will be collected at the entrance to this passageway.

It is anticipated that the number of movements of rapid transit trains, trolley cars and buses at this terminal when the entire extension is in full operation will be equal to if not in excess of the total car movements at Park Street station in the Tremont Street subway.

South of Ashmont terminal bordering on Codman Street there will be provided a rapid transit yard containing eight tracks and a loop which will accommodate 90 Cambridge subway cars. The yard is sufficient to provide an ultimate storage for 206 cars along with a suitable repair shop.

"Ask Me Another," as Practiced in Fort Worth, Tex.

INTERESTING transportation points are brought to the attention of the trainmen of the Northern Texas Traction Company, Fort Worth, Tex., by a novel method, which is mentioned in the company's brief for the 1927 Coffin Prize. The method is known as the "Question Board."

Each week a question dealing with some phase of the company's business is posted on a bulletin board in the trainmen's clubroom. A prize of $1 is given to the man getting closest to the correct answer. It is felt that the offer of some prize like this, even if nominal in amount, adds to the interest taken in the competition.

A typical question, posted on April 21, with the way in which it was asked, follows:

> How much time, in minutes, is consumed in the proper adjustment of race signs in a car in a run of ten (10) round trips on Arlington Heights?
>
> A dollar bill will be given the operator who furnishes the nearest correct answer.
>
> Arlington Heights operators and extra men operating Arlington Heights cars between this date, April 21, and Sunday, April 24, please answer.

The method of posting the correct answers may be illustrated by those received to the question just given. This competition closed on April 24 and the result, which was posted April 25, read as follows:

> The following answers were received to the question of "How much time is consumed in the proper adjustment of race signs on Arlington Heights, in making ten (10) round trips?
>
> The time consumed was 290 seconds by an actual check made with a stop watch for ten (10) round trips. Operators D. B. Stanley and J. R. Brown turned in the nearest correct answers of 300 seconds each and are the winners of the prizes.

In cases where the replies received bring the correct solution to some debatable question of operation, bulletins of greater length are posted, outlining the company's future policy in this respect.

Logical Valuation for the Utilities

Cost of reproduction is recognized by the Supreme Court as present value and should be accepted by commissions. Valuations, when required, should be made by commission staff

By William A. Prendergast

Chairman of the Public Service Commission of the State of New York

Speaking before the annual convention of the National Association of Railroad and Utilities Commissioners held at Dallas, Tex., Oct. 17-21, Mr. Prendergast made an able plea for the uniform valuation of utilities, even if state legislation is necessary to authorize it. The address, here presented in abstract, is an able treatment of the subject and merits careful attention of every one interested in valuation and rate problems.—EDITOR.

HAS the regulatory concept justified itself? The friends of regulation of public utilities are able to offer many cogent arguments in its support in the form of accomplished acts. In fact, it is easily possible to prove that the system has decided advantages over any methods that were ever followed before state regulation was introduced. But there are undoubtedly some shadows in the picture. It will be useless for the advocates of regulation to deny this. It may be said that there are two very deep shadows at the present time. One is the jurisdictional authority of the Interstate Commerce Commission, conflicting as it frequently does with state authority. The other is the failure on the part of the state commission to have developed a definite policy in respect to the principles of valuation of public utility properties. Critics of regulation go so far as to say that the disagreements regarding principles of valuation at the present time may wreck the future of the regulatory system, and that there are serious limits to the extent to which regulation is itself effective. It is to the second of these propositions that this paper will be addressed.

Let us examine the question fairly and discuss it with candor. It is twenty years since state regulatory laws established commissions with considerable and broad powers over the conduct of public utility business. Now in the earlier years of commission regulation the problem of valuation was not a serious one. In the beginning the two important things these state commissions were supposed to do were to control properly the issues of securities to prevent stock watering and reduce the rates charged by public utilities. The reduction of rates was accomplished in many cases prior to the Great War without recourse to any very well-defined valuation of the properties. It was not until the war reaction toward high price levels, accompanied by the desperate resistance of these demands by municipalities and citizen organizations, that the question of valuation commenced to loom large and the great importance of the question in the structure of rate making made itself evident. Simultaneously there came the assertion by utilities of their right to a full recognition of the value of their properties, and the equally insistent effort of the representatives of the localities to secure the lowest possible basis of valuation.

The commissions have attempted to deal fairly and justly in this tense and litigious situation, but their decisions have indicated a noticeable effort to establish the lowest possible measure of valuation, often unsustained by evidence, and in many cases unsupported by arguments of a convincing character. The natural result has been appeals to the courts, reversals of commission determinations and much public disapprobation.

The wide divergence of opinion upon this question of valuation which is manifested in commission decisions certainly affords inspiration to the critical instinct. The question therefore arises, Does this problem of valuation endanger the stability of our present regulatory system? Have the commissions grappled with the valuation problem fundamentally? Many decisions indicate a genuinely studious effort to find a solution of this problem, but it is also true that a similar number seemingly manifest an effort to avoid a declaration of definite principles. It is also true that even when faced by adverse court decisions commissions seem to make an effort to avoid the full implication of the court's fiat and incline toward a standard of valuation which will arouse the least possible adverse political comment.

Justification for Past Policies of Commissions

Much may be said—and with good reason—in support of the idea that it may not have been wise for the commissions at a too early stage to attempt to enunciate conclusive doctrines, and in the period from 1918 to 1922 such a policy may have been justifiable. At the present time, however, and for the past four years at least, the economic situation has been such that, with all reasonable conjectures as to immediate future happenings, we can definitely state that we have passed from the stage of the speculative into the stable, with the resulting responsibility of better defined or more settled judgments on questions affecting the course of regulation. I do not mean to imply that the past ten years have been barren of consideration of the different elements of the valuation problem. Decisions contain many references to "original cost" and "reproduction cost," but these discussions are finally enveloped in a mist of indecisive rhetoric which even the courts cannot unveil. During the post-war period there have been a number of court decisions, the trend of which has been strongly in the direction of recognition of so-called "reproduction cost" as a determining element in the ascertainment of "present value." This has been enunciated by the Supreme Court of the United States. While there was a check to the general acceptance of this doctrine, indicated by the decision in the Georgia Railway & Power Company decision, it may be said to have been removed by the McCardle decision.

Are we not now at that turn in the road where the utility commissions must decide (1) to accept what the courts have decreed, or (2) to seek legislation from their states to establish the principles they should follow, or (3) to agree upon some definite policy of their own? The first suggestion—to abide by the rulings of the United States Supreme Court—is, of course, the path of least resistance; the second—to have recourse to a legislative edict on the subject—is, in my opinion, inexpedient for reasons which I will state later; the third—that the commissions seek to find a conservative and fair policy of their own which will square with the legal principles as enunciated by the courts—seems to be a duty which the commissions ought to assume without hesitation or evasion.

It is during the past ten years that rate proceedings have assumed a new significance in our economic life. Perhaps the utilities have taken a too aggressive attitude in the trial of rate cases and should have exhibited a greater disposition not to insist upon their rights under the law, especially with respect to the fixation of a fair value of their properties. But they have, and it is this very insistence which gives us our valuation problem today.

It might serve a useful purpose to inquire as to whether the utilities have not been forced into their position by the extreme course taken by public authorities, especially those representing certain municipalities. There are cases without number which could have been speedily settled by commissions without protracted proceedings if it had not been for the unreasonable attitude of representatives of the public. The consequence has been that these cases have had to proceed to a determination with the finding of valuation figures inuring to the advantage of the utility and the embarrassment of the municipalities.

In cases where the utilities have objected to the findings of the commissions the courts have by their rulings established precepts of valuation which stand as a protection to the utilities in the future. We have therefore had an economic battle between utilities and commissions, the net gains of which up to this time have been on the side of the utilities. I assert that much of this would have been avoided if municipalities had taken a reasonable stand, and if public officials had not frequently sacrified public funds and public time in order to enhance their own political prestige. At the risk of repetition, may I say that the public has lost by this policy, because rates have been advanced and valuation principles established by the courts in a manner which has immeasurably strengthened the utilities.

Attacks on "Reproduction Cost" Theory

We have now reached a period in regulation where valuation has become a potential issue, with the "reproduction theory" as the chief point of attack, this being due, and very naturally, to the fact already noted that the trend of judicial sanction has been in that direction. The reproduction theory if followed will in nearly all cases produce a high valuation. It therefore invites the opposition of representatives of municipalities and civic organizations. They are against it for this reason. The merits of the subject, whatever they may be, have little influence upon the ideas of these public officials. Some alternative suggestions to the "reproduction theory" are advanced with great persuasiveness and force by critics of this doctrine.

The dissenting opinion of Mr. Justice Brandeis, concurred in by Mr. Justice Holmes, in the Southwestern Bell Telephone case advocates "prudent investment." At the same time one cannot help believing that under this subtle title there rests contentedly our old friend "original cost." To argue with Justice Brandeis' opinion would be presumptuous, but it must be said that no court has yet upheld the theory or directed its application to any particular case. It is also worthy of note that in his dissenting opinion in the McCardle case, concurred in by Mr. Justice Stone, Mr. Justice Brandeis says little concerning "prudent investment" and devotes his attention to the idea that "the estimate (of value) to be in any way worthy of trust must be based on a consideration of the varying costs of labor, materials and money for a period of at least as long as would be required to construct the plant and put it into operation," and again he says, "but where a plant would require years for completion the estimate would be necessarily delusive if it were based on 'spot' prices of labor, materials and money."

Worcester Case Repudiates Reproduction Basis

Quite recently we have read a determination of the Massachusetts Department of Public Utilities in the case of Customers vs. Worcester Electric Light Company. This was widely spoken of as a repudiation of the reproduction cost theory as expounded by the Supreme Court of the United States and a reassertion as well as a vindication of "prudent investment." I think it is very material in our present discussion.

There are four recorded opinions in the case. They furnish figures respecting value all the way from an assessed valuation of $4,571,200 up to a reproduction cost claimed by the company, less depreciation and including overheads, totaling $17,837,000. The value of the property was fixed by the commission at not to exceed $10,000,000. In a spirit of inquiry or curiosity it would be consoling to know just how that value was determined. Why does $10,000,000 mark "prudent investment?" The principal opinion states that the value is based on the McCardle case and other recent decisions of the Supreme Court, though how it does so is not clearly stated.

If "prudent investment" possesses those merits which have been claimed it should be something that may easily be understood and defined. If one has to take an arbitrary figure, the sources of which cannot be discovered from a careful reading of the decision, does the theory give us a simple and stable basis, which its advocates have claimed for it, in determining value of a public utility's property?

Despite the trend toward acceptance of "reproduction cost" in current decisions there are able and alert opponents of the idea. Among the foremost is Dr. John Bauer, whose book "Effective Regulation of Public Utilities" has received wide attention and much deserved praise. In addition to this, Doctor Bauer has furnished us with a number of interesting articles embodying the views expressed in his book. There have also lately appeared a series of articles by the Rev. John A. Ryan, D.D., professor of moral theology and industrial ethics at the Catholic University of America, published in the "Catholic Charities Review," assailing the cost-of-reproduction formula, which for vigor of expression and enunciation of economic principles makes most utterances upon this subject appear like nursery rhymes. Father Ryan denominates the reproduction cost idea as "The New Usury."

Doctor Bauer's Plan

Doctor Bauer does not act only in the capacity of a critic; he presents a plan in the *Harvard Business Review*

of October, 1926. He admits that the present situation is chaotic, and that if we are to cut our way through the confusion we must place regulation on a definite and workable basis for the future. This means, he says, that we must abandon the "fair value" basis and adopt a definite and determinable basis of rates, which can be readily administered upon undisputed facts without conflict between public and private interests. So far as future investments in property are concerned, Doctor Bauer would frankly base the return on actual investment which can be shown definitely in the accounts, under commission jurisdiction and without any possibility of dispute. As to existing investments, he would start with a definite initial value of existing properties "based upon reasonable considerations of the various conditions and fair treatment of the investors. There would be no general advantage in confiscation, even if that were possible under the Constitution." Dr. Bauer continues:

> My proposal is to start with an appraisal at actual cost of installation and deduct depreciation so as to fix the present net monetary investment in each property. Then this amount should be so adjusted as to meet the requirements of fair treatment. I should urge particularly that an allowance should be made for the common stockholders' investment so as to compensate them for the change in price level since the time their investments were made. While this might be viewed as an element of present reproduction cost, it would be allowed on the grounds of equitable treatment. It would not be applied, however, to the entire property, for the bondholders and preferred stock holders would be contractually limited to the stipulated interest and dividend rights as fixed by the securities issued. Even if such an adjustment were made upon their investment, they would not obtain the benefit, so that there is no demand in fairness for such an allowance. . . .
>
> In any event, I should urge that a final valuation of existing utility properties should be made. Whatever reasonable adjustments in any respect may seem desirable and just in any case, they should be made once for all and then incorporated in a fixed sum for the future. This final amount should be fair, but should not be subject to future reconsideration, and this fact itself should be duly considered in view of fairness. There would be no future changes either on account of price levels or shifting conditions of operation. . . .
>
> To this initial valuation, as entered into the accounts, would be added all future additional investments in improvements and extensions. These would all be entered in the accounts at actual cost under commission supervision. All the properties, those included in the initial valuation as well as subsequent additions, would be fully maintained through repairs and provisions for depreciation and renewals. The rate base at any time would consist of the original cost of the properties as shown by the accounts, less the depreciation reserve. . . .

Father Ryan gives his approval generally to the plan proposed by Dr. Bauer, adding, however, "another method of giving the stockholders some increase in valuation is to allow them the full advance that has occurred in that portion of their property which consists of land" and, again, "still another method would be to allow a higher rate of return on stock which was issued before the great rise in prices than on later issues. Instead of an increase in valuation there would be an increase in the rate of interest. On its face, however, this method seems to be less practicable than the other two."

Why Use Reproduction Theory in Part Only?

Both critics whom I have cited concede that there are certain circumstances under which the present cost of production, or reproduction cost, should be recognized.

It is admitted that there are certain conditions under which present cost should be applied, but confined to only a part of the property. Why a part? To whom does the property belong? There is no legal division of interest or title. Certain securities the company has issued have a definite preferential status. But the title to the property is in the company, and the common stock holders own the company. If they have preferred to borrow money on bonds and mortgage their property it is their affair. Certainly they do not by that act part with their title. The earnings to which their company has a right under the law must come from the property. The manner in which those earnings may be distributed in interest or dividends is the business of the owner, subject to such obligations as he may have imposed upon himself. So that, without entering into a prolonged discussion on this point, it would seem to resolve itself into this—that the common stock holders are entitled to have their investment recognized on a reproduction-cost basis. If this basis should apply to that portion of the property represented by their investment, why should not the same basis of valuation apply to the rest of the property? I ask this question because I am not convinced by the arguments used by Father Ryan and Dr. Bauer. It also seems to me that their support of the reproduction theory only in part is a significant development in the general discussion.

It may be superfluous to say that the decision of the Supreme Court of the United States in the Indianapolis Water Company case has been epochal in the history of regulation. While other decisions have indicated a certain trend of opinion in the direction of reproduction cost as the basis of valuation, this case seems definite on that question. In addition it should be remembered that the court there cited with approval views of the lower courts on the subject, particularly in the New York State $1 gas cases, where strong ground was taken in favor of reproduction cost, observed depreciation, a relatively high rate of return, and going value. Reference is made to the case only to emphasize the statement heretofore made that it is now time for commissions to adopt and follow some well-considered procedure in order, if possible, to remove this question of valuation from the domain of political debate.

Commissions Should Settle the Question

It is my opinion that the duty is now imposed upon the commissions to do this thing and that the National Association of Railroad and Utilities Commissioners should assume leadership in the undertaking. If it is not done there is the greatest danger that the subject will be made a political issue, with results that no candid student of regulation believes will be determining, and which will undoubtedly lead to greater confusion. If this question becomes a purely political one it will surely be presented to the legislatures of the states for settlement and we will have political judgment upon economic questions.

I offer this criticism of legislative dictum on a subject of this character because I do not believe that it can ever receive the necessary study from the legislative bodies, and we must all recognize the fact that the political instinct would prove the chief motivation in any decision which legislative bodies will render. This has been the result of such efforts throughout the entire history of the regulative theory.

It would, in my opinion, prove a great public boon if there were a general agreement among utility commissioners in respect to the treatment of valuation. Is it possible to accomplish this? The courts have prescribed certain principles, but this does not mean that a reasonable formula for the execution of those principles would not meet with general public acceptance and be sustained by the courts. There is no disagreement, or should be none, that it is the present fair value of the properties that is

to be determined; that is, a fair value as of the time of the proceeding, or, if it were possible to make a valuation of all utilities, this value should be determined as of the time when it is made. How can present value be determined except by present prices, subject, of course, to the depreciation in the property; this to be fixed by competent examination? A new economic age has arrived. Let us consider our present problems in the light of present conditions.

I am inclined to believe that the main difficulty in arriving at a satisfactory basis for determining the "present fair value" of a property arises from the fact that in many cases the overheads and going values claimed by the companies are from any reasonable viewpoint generally claimed on a basis which is grossly excessive. It may be well within the facts to say that the size of such claimed values has done much to arouse opposition to the reproduction-cost theory. But these issues are susceptible of fair and adequate treatment. If these claims are considered by the commissions in the light of reasonableness and reduced to their proper size, and the decision fortified by convincing arguments, it is almost certain that the view of the commission will be sustained by the courts. Most of the reversals arise from the fact that these issues are either ignored or, if recognized, given a consideration which is manifestly inadequate.

Ideal State of Regulation

The ideal state of regulation would be the establishment of valuations for all companies with the necessary modifications of additions and withdrawals from time to time. In this way there would be a rate base which would be a continuing basis for such changes in rates as conditions warranted. Viewed from a practical standpoint, the task seems most difficult. But at the same time it is in my judgment one of the chief functions of regulation and therefore a problem which should be mastered.

People generally suppose that with reports filed annually by the utilities it is simply a question of consulting these reports in order to fix rates. But the obstacle is that the fixed property values appearing on the books do not reflect the actual present values of the properties and for that reason the reports do not serve the required purposes.

Shall there be undertaken a complete appraisal of all the properties of all the utilities excepting interstate railroads? This will require an immense expenditure. Will the states burden themselves with this expense? I could quote some instances which would discourage the mere suggestion of their doing so. If the work is to be undertaken it would have to be done by the commissions through their own staffs, as the valuation of the railroads has been and is being done by the Interstate Commerce Commission. I wish to point out that this would be necessary because I fear that there would be a demand on the part of the localities that they should participate in the work. This would undoubtedly then take the form of a valuation proceeding, with the consequent loss of time, which would be ruinous to the enterprise. Legislative sanction would be required for this work and this would invite the problem of a legislative program of the principles on which the valuations should be based. I believe, however, that as a preliminary to any policy on this subject it is important that in every rate proceeding the commission should find a valuation. This being done, at least a beginning will be made in having the necessary data on which required changes may be based.

Many Ride-Selling Ideas Developed on Northern Texas Traction

MANY ride-selling ideas have been developed in the past year by the Northern Texas Traction Company, Fort Worth, Tex. Several of a novel type were described on page 845 of the issue of this paper for Nov. 6, 1926. Others developed during the past year and mentioned in the company's brief for the 1927 Coffin Prize are given below:

An arrangement has been made for display advertisements on the paper laundry bags used by the Adolphus Hotel, Dallas. The advertisement shows a view in color of the company's "Crimson Limited," which runs between Dallas and Fort Worth. This kind of display advertising is considered favorably because it reaches the stranger in town who may not be as well acquainted as the residents of Dallas with the excellence of this interurban service.

A large display sign has been placed on a building which the company owns in Dallas so that there is no cost except that of placing and maintaining the advertisement on the sign.

The company arranged with a local paper in Fort Worth to publish a blank map of the city for seven consecutive days. Surrounding this map were advertisements of various business concerns. A prize was offered to the person who would come nearest in tracing the car lines on the map and fixing the locations of the business concerns advertising in connection with the contest. The plan served to familiarize a large number of people with the routes of all of the more important lines.

Arrangements were made with a large department store by which it offered free rides homeward on April 30, 1927, to all who would call at one of the stores for tickets. This offer was coupled with a special sale made by the store on that day. It must have proved satisfactory to the merchant because it is the fifth time that he has made such an arrangement with the railway company. The latter has offered a similar arrangement with any other department store.

Considerable advertising is done by radio as the company puts on a program for an hour every two weeks at a local broadcasting station. It is also an extensive advertiser in the daily newspapers, uses the backs of theater tickets to some extent, and employs poster and sign advertising.

Auto Bus Transportation Occupies Important Position in Minnesota

INDICATION of the extent to which auto bus transportation has taken hold in Minnesota is given in the annual report of the Minnesota Railroad and Warehouse Commission, which states that in 1926 auto transportation companies accommodated more than 12,000,000 passengers and collected $4,627,000 for services rendered. A total of 402 vehicles, of which only 119 were confined to local transportation, operate on 4,870 miles of roads throughout the state, which have been assigned by the commission. In addition to the transportation service rendered by the buses, their operation has benefited the state in the amount of $219,000 paid for vehicle licenses and $64,000 for gasoline tax.



This handsome passenger station at Gary, Ind., has been erected by the present management to replace a small brick structure

Good Service Has Paid

on the South Shore Line

A rapid and reliable freight service has brought patronage and will be supplemented by motor tractors and flat cars for sections not reached by the railroad. Aggressive merchandising methods adopted

IN THE issue of Nov. 5 some particulars were given of the notable rehabilitation of the Chicago, South Shore & South Bend Railroad under its present owner, the Midland Utilities Company, which has had the property for only about two years. New equipment has been introduced and the public has promptly responded in patronage to the better service given. The previous article was devoted largely to the changes made in the passenger service and equipment, including the introduction of a co-ordinated motor coach transportation system. Other noteworthy features are the changes made in the freight service, the method of advertising the facilities afforded and the engineering improvements not mentioned in the previous article. This information, like that in the previous article, is abstracted from a brief which the company presented in the competition for the Coffin Prize in 1927.

Improved Freight Service Given

One of the first steps taken by the new management to build up the South Shore Line was the establishment of a fast and reliable freight service. Reference was made in the previous article to an overnight less-than-carload service which was begun between Chicago and the cities served by the South Shore Line. This was one of the first things done. Commodities delivered to the railroad in Chicago in the afternoon were hauled ready for pick-up at their destination the following morning. The plan was so successful that this service has been extended to include cities on adjacent electric lines. It has proved popular, as well as profitable.

Seven receiving stations for less-than-carload freight have been established in the heavy shipping sections of Chicago, providing a most convenient form of service for shippers. Freight delivered to these stations is carried to the railroad by tractors and trailers. These seven stations are used jointly with two other electrically operated railroads in Chicago, thereby reducing the overhead for each line and providing a convenient local point for shippers' trucks with material to be shipped north, west or east.

An aggressive policy governing the handling of carload freight was instituted by the South Shore Line's new management. Due to the industrial nature of a major portion of the cities served, it was recognized that this branch of operation could be developed into an important revenue producer.

New and improved interchange tracks have been built with nine steam railroads and one electrically operated railroad. Through rates to the eastern and western seaboards were established, making possible the handling of carload freight originating on Eastern lines for

Chicago and the West, and vice versa, as an intermediate carrier.

The railroads with which interchanges are now operative are: Illinois Central, Nickel Plate, Wabash, Elgin, Joliet & Eastern, Baltimore & Ohio Chicago Terminal, Indiana Harbor Belt, Pullman Railroad, Belt Railroad of Chicago, the Chicago & Calumet River Railroad and the Chicago, South Bend & Northern Indiana Railroad. The latter is electrically operated.

By using the South Shore Line, interchange shippers have found that at least 24 hours can be saved in delivery



The South Shore Line has published some very handsome posters. These give an idea of the variety of the places served

time, either to eastern or western points. This is made possible through the fact that on the South Shore Line high-speed service is available and the badly congested freight classification yards around Chicago are avoided.

Every effort is made to insure reliability in the railroad's freight service. Speed is one of the governing factors and the carrying out of promises another. In cases of emergency especially fast shipments have been made, resulting in wholly satisfied and oft-repeating customers.

New Freight Equipment Ordered

Equipment which will make possible a wider extension of merchandise service by the railroad has been ordered and is now being built under new patents and will be delivered shortly. It consists of gasoline-driven tractors, trailers and specially designed flat cars. The trailers can be loaded at some distance from the railroad, hauled to freight stations, run onto the flat cars, where they are anchored, and carried to any point on the line. At these points they will be attached to other tractors and hauled to their destination. Through the use of this new equipment, which will go into service immediately upon delivery, the South Shore Line can develop new territory for its freight service many miles off the line.

Four 80-ton locomotives, equipped with four 350-hp. motors each, were purchased at a cost of $218,000 to take care of the freight service. They were placed in service in August, 1926. Freight traffic became so heavy, however, that two additional locomotives were purchased early this year. They are 53-ton engines and are used in switching and other incidental work, releasing the heavier locomotives for through freight trains.

Upon investigation by the traffic department, it was found that Kalamazoo, Mich., and near-by cities were without adequate overnight freight service from Chicago, and that the South Shore Line, in co-ordination with motor trucks, could provide it. After a survey it was inaugurated and during the three or four months it has been in operation has shown substantial monthly gains. Trucks used in this service are owned and operated by a company affiliated with the South Shore Line. They meet the trains at South Bend and transfer the loads of freight.

Merchandising Methods Used by Traffic Department

Modern methods of solicitation and merchandising were adopted immediately upon the acquisition of the line by the present management. An experienced traffic department was organized with separate freight and passenger departments. Tariffs and other files necessary for its efficient conduct were gathered. An extensive personal solicitation campaign was begun with regular calls on shippers in the cities served.

Business was developed along mass lines. Picnics, outings, special movements of lodges, clubs and various other organizations were handled into the Dunes region and to other spots in the territory served. Football games and class reunions at Notre Dame University were profitable from a standpoint of splendid trains.

Traffic solicitors experienced a quick reaction on the part of the public to the improved facilities on the railroad, in both freight and passenger service. Many shippers who had been using their own trucks and trucks of highway shipping organizations changed to the more dependable service of the South Shore Line.

In passenger service several classes of commutation rates were placed in effect, further stimulating the increase in volume of traffic. Week-end and one-day excursion rates were also placed in effect for mass travel on special trains or on holidays.

Function of the advertising and publicity departments has been most extensive, due to the railroad's policy, consistently applied, of telling the public of the new order of things. Trained advertising and newspaper men are in charge of this branch of the company's organization.

As each step in advance in the railroad's improvements was completed many columns of newspaper space, both in paid advertising and in the news columns, resulted. A systematic campaign of advertising the regular service has been adhered to by this department, with special advertisements for unusual events and changes.

Editors of all papers in the railroad's territory were visited by heads of the publicity department and told of the new aims of the company and of its policy, both as to publicity and operation of the railroad. A policy of co-operation with newspapers was established. In the event of an accident on the line full details are given by the publicity department to the papers in the section affected. This plan has met with approval on the part of the editors and it insures accurate information in the papers, as they have come to depend on the publicity department for their facts.

In cases of development or other news, accurate information is supplied the papers and results in the use of nearly every item. It is a rule that nothing except real news is ever submitted to the newspapers.

Included among the other forms of advertising prepared by this department is a one-sheet lithographed poster, posted each month at the stations on the line and at elevated stations in Chicago.

Poster Wins Merit Award

Three of these posters were accepted for exhibition in the sixth annual Exhibition of Advertising Art in New York City this spring and one of these three was awarded the Art Directors' Club medal and the Barron Collier medal for unusual merit. There were 333 exhibits on display from the most prominent advertisers of the country.

The posters are in attractive colors and picture points of attraction and interest in the territory served by the railroad. They have also met with favor in schools and clubs devoting their study to art.

South Shore Lines, a publication issued for patrons of the railroad, is published every month by the advertising and publicity departments. In it events on the railroad are chronicled, with interesting changes in the company's operation. Each month a story is printed telling of the operation of one of the industries in the territory served by the railroad, resulting in interest on the part of readers, as well as manufacturers. For distribution, it is placed in stations and on cars and a large number are mailed each month to a selected list.

The unique and attractive Indiana Dunes region, at the southern end of Lake Michigan, served by rail almost exclusively by the South Shore Line, has been exploited to a great degree as a site for outings, hikes and picnics by this department. There has been a marked increase in travel to the region as residents of Chicago and other cities served learn of its many beauties. Pamphlets, posters, car cards, newspaper advertisements, special articles in periodicals and many other forms of advertising have been used.

As soon after the line was taken over as work could be started all principal passenger stations were remodeled in order to improve their convenience and comfort. Both exteriors and interiors were made more appealing and inviting by rearrangement and new decorating.

Although it was known by the management that in the near future some of the stations would prove inadequate even after reconstruction, this work was carried out in order that the public might be convinced of the policy of the new management in providing for its comfort.



This artistic poster received medals at the Exhibition of Advertising Art

In May, 1927, one of the finest union rail and motor coach stations in this section of the country was occupied at Michigan City, Ind., by the railroad and its subsidiary, the Shore Line Motor Coach Company. The station, together with an undercover motor coach loading platform and modern garage, represents an expenditure of more than $200,000.

The station proper is a two-story brick, steel and concrete structure. Offices of the operating heads of the coach company and a hall for employees' meetings occupy the second floor. An ornate front of terra cotta, with large plate glass windows and flood and bracket lighting, presents a handsome appearance. The interior is most inviting, with spacious benches and lounging rooms for men and women. Trains stop at the south end of the station and coaches load and unload at the opposite side.



The view at the left shows a portion of the South Shore track at the time of rehabilitation. That at the right a portion of the same section of track as it appears today

In four of the company's principal stations facilities have been provided for the serving of light lunches and other refreshments. This has proved a distinct accommodation to patrons of the railroad. To insure service of the highest standard the railroad operates these concessions. They are most attractive in appearance and are very inviting because of the courteous attendants.

Engineering Features of Rehabilitation

In the engineering studies prior to the adoption of a changeover plan from a.c. to d.c. a great deal of thought was given to economy in operation. The final choice of a 1,500-volt direct-current system was influenced to a large extent by the fact that considerable economy would result. Higher voltages materially reduce power loss, with a minimum expenditure for conversion and distribution systems. The South Shore Line is one of the first railroads of its kind making use of this type of current with multiple-unit equipment.

Following the selection of 1,500-volt direct current the type of conversion equipment which was to be used became the next problem. Considerable attention was also given to various types of this equipment. Rotary converters, which are the standard conversion units used for railroad work, had some disadvantages when adapted to the type of current chosen for the South Shore Line, as it involved the operation of two machines in series.

While this had been done in several places and had proved reasonably satisfactory, the fact that a new conversion medium, the mercury-arc rectifier, was beginning to be considered adaptable to railroad work was given careful consideration.

In view of the fact that this new type of converter seemed to offer material saving, due to its higher efficiency, it was decided that the South Shore Line would be justified in making extensive use of this new piece of apparatus. The mercury-arc rectifier was adopted with the realization that the railroad was pioneering, in that it is the first 1,500-volt line in this country on which this type of converting equipment has been installed.

It was also expected by the management that many problems which would require careful co-operation with the manufacturer for solution would also be encountered. One-half of the stations supplying the line were equipped with mercury-arc rectifiers and the entire system from Michigan City to South Bend is entirely dependent upon their successful operation. They were placed in regular service within the last year.

The success in operation of the mercury-arc rectifiers has demonstrated that the faith of the company's engineers has been justified. Many improvements have been made on them within their short life, and it is believed that in the future their performance will more than justify the confidence placed in them.

Automatic Control of Substations

Knowing the progress which has been made in recent years in automatic substations the company's electrical engineers decided to use this type for six of the eight substations which supply the railroad with power. Four



The view at the left illustrates two semaphore type signals formerly in use. These have been replaced with color light signals, as shown in the right hand view

of these are rotary stations and the use of automatic control for their operation required but little change from facilities used in 600-volt operation. There were a number of problems which had to be solved, however, due to the fact that this was the first railroad using the substations on 1,500-volt operation.

In the effort still further to extend the use of automatic electrical equipment, an automatic supervisory control system was installed. This presented many new problems, as it is the first system of its kind ever applied to a mercury-arc rectifier. In making this installation the management realized that unquestionably a number of new problems would develop for solution by the company's engineers and the manufacturers' experts. In view of the great economies possible through its use it was decided upon, even in view of the pioneering necessary for its successful operation.

The distances between substations over 75 miles of line and the opening and closing of direct-current switches by this control system presented another problem, the solution of which was made possible by the use



One of the highway crossing signals used on the South Shore line. The base is made conspicuous by the alternate black and white lines in herringbone pattern

of a new system of automatic supervisory control, the carrier-current system.

This system, although untried, was adopted because of its economies. The first cost is less, due to the necessity of only a single line wire for its operation. Two dispatcher stations were provided, one for the power company's dispatcher for use in handling high-tension switching and the operation of conversion equipment and the other for the railroad's dispatcher in opening and closing the feeder equipment.

In the interest of further economy the railroad succeeded in negotiating a contract with the power company whereby it provided the conversion apparatus. Through the co-operation of engineers of the railroad and of the power company a system was worked out by which the best possible use was made of transmission line facilities which existed and brought together the best engineering ability of both companies in developing the new system.

Improvements Made in Permanent Way

Due to the fact that trains are operated over single track on the South Shore Line between Gary and South Bend, sidings are necessary at meeting points of trains. Formerly trains at these meeting points were run onto the siding and, after the train in the opposite direction had passed, backed out.

In the rehabilitation all sidings have been double-ended and equipped with high-speed turnout switches, enabling a train to operate onto the siding at high speed and, if the meeting train is waiting, to run through the siding without loss of time. The sidings were also lengthened to make possible their use by longer freight and passenger trains.

The siding at Wilson, Ind., one of the principal single-track meeting points, has been double-tracked for 2½ miles. This permits a flexibility of six minutes in the meeting time of trains. This track will be made a part of the double track of the railroad when this point is reached in that program.

Coincident with these changes, 30 single-track miles of 70-lb. rail was replaced with 100-lb. rail and nearly one-half of that mileage has been rock ballasted. More than 67,000 creosoted red oak ties have been used to replace old ties in the railroad.

Grading of the right-of-way, tending toward better drainage and safety, has been improved and more than 2,000 carloads of cinders used as ballast. New tie plates, angle bars and bonding have also been installed in the reconstruction of the track.

It was recognized that a number of years would elapse before all of the old 70-lb. rail could be replaced and, accordingly, new joints were put on this rail throughout the entire line. Tie plates used are double punched, making possible their use when the heavier rail is installed.

Twenty-five new railroad cross-overs have been built and entirely new layouts were installed at the Michigan City and South Bend yards of the railroad. In all track renewals the most modern type of special trackwork was installed. Manganese cross-overs and other hardened steel special work has been standard for replacements. The heavy rail and these high-class forms of special work tend toward greater ease in riding and in eventual economy, although the initial cost is somewhat greater.

New Type of Line Cars

One of the old-type motor passenger cars was rebuilt into a line car in the company's shops, having several unique features. A revolving platform, which can be swung under the wire on the adjacent track, tops the car. Its advantages are apparent. The platform is elevated from its position on the top of the cars by air hoists and the equipment has several major safety features.

As an operating economy and with a view toward eliminating as many work trains from the railroad as possible, a gasoline-driven highway motor truck was equipped with tools necessary for its use as a line car for making light repairs on the overhead system. It can also be used in case of an emergency power shutdown and has proved economical through the elimination of crews necessary to operate the line car.

New Telephone System Built

All dispatching on the line is done by telephone. In order to improve its communication service, an entirely new telephone system has been built by the railroad, under the supervision of its communication engineer. The latest type of telephone equipment was used in the system and latest practices of construction used. As an example, a radio loud speaker, with an amplifier, is installed in the dispatcher's office for receiving calls from trainmen, making unnecessary the usual earphone attachment.

In addition to the dispatching system private wires for the transaction of the company's business are in service

connecting South Bend, Michigan City, Chicago and Gary. One of the interesting features of this new system is the arrangement made with the local telephone company for the connection of its lines and the railroad's private lines on the same switchboard. This makes possible the most economical use of both owned and leased wires.

A dispatching system for the motor coach line is included in this system. It is in use over a major portion of the coach line and is in the process of construction for the remainder of the system. Train and coach delays and other operating inefficiencies have been materially reduced by this new system of communication.

Improved Shop Practices

Electrically driven jacks for raising and lowering car bodies have replaced hand jacks in the South Shore Line shops, one of the more efficient methods adopted during the past year. The use of the new type jacks represents a saving of about 15 per cent in cost over the old method and provides increased energy for other duties on the part of the workers.

Reduction in maintenance costs was effected in the shops through the use of newly built electric ovens for the dipping and baking of armatures and fields of the motors used.

Shop tests have been made on the use of spray lacquer and the results have been so satisfactory that the twenty new passenger cars now under construction are to be finished in this recently developed product. Two of the passenger cars now in use have been refinished with lacquer.

Another practice which it is believed will lower the power costs to the railroad materially is soon to go into effect. Power-saving meters are being installed on all motor passenger cars and on locomotives and an organization is being perfected to carry on a systematic power-saving campaign.

Due to the many changes in operation with which the employees of the railroad had to become acquainted, it was deemed inadvisable to begin this power-saving campaign previous to the present time.

Signal System Rebuilt and Other Safety Measures Installed

When the South Shore Line came under the present management the signals in use were of the semaphore type. Due to the fact that they had not been given proper maintenance they had deteriorated to the point where signal failures were not uncommon. In order that the signals might be made to carry out their work of speeding up operation, at the same time providing maximum safety, a considerable amount of money was immediately spent on their rehabilitation, although it was apparent that a change in type would be made within a short time. The rebuilding program was carried out to a point where the confidence of the trainmen was restored and failures were reduced materially.

In order that maximum benefits could be realized from the signals it was decided to replace the semaphores with a color light signal. Due to the fact that the semaphores were placed close to the pole line for the overhead they were not easily distinguishable in many places. In carrying out the work of rebuilding all possible use was made of the materials used in the old signals. Additional facilities were provided for the reduction of maintenance and the increase of reliability, and other improvements made.

At several points on the line crossings with other railroads are interlocked. All of these interlocks have been completely rebuilt, providing a maximum of efficiency and safety.

The company also established an extended safety campaign by posting safety messages in its trains, holding safety meetings among its employees, organizing first-aid teams, offering a medal (known as the Britton I. Budd medal) for the saving of human life, appointing a safety engineer and in many other ways. It has also started a "better business campaign" among the employees, has organized an A.E.R.A. company section and in many ways shown its interest in improving working conditions among the employees.

Financial Accomplishments

As already explained, at the time the present management assumed direction of the South Shore Line it was impossible to enlist outside capital as a means toward placing the railroad on a level necessary for efficient operation. In this emergency the Midland Utilities Company took over the task of financing the railroad. Had this not been done, it is probable that the operation of South Shore Line trains would have been discontinued within a few months. The railroad has also had the benefit of the expert engineering and purchasing facilities at the command of the Midland Utilities Company.

As an indication of the improved financial situation of the railroad, there were recently issued $2,310,000 equipment trust certificates, under the Philadelphia plan, maturing in from one to ten years, on a basis of 4½ per cent, 5 per cent and 5½ per cent.

Novel Features in Railway Substation



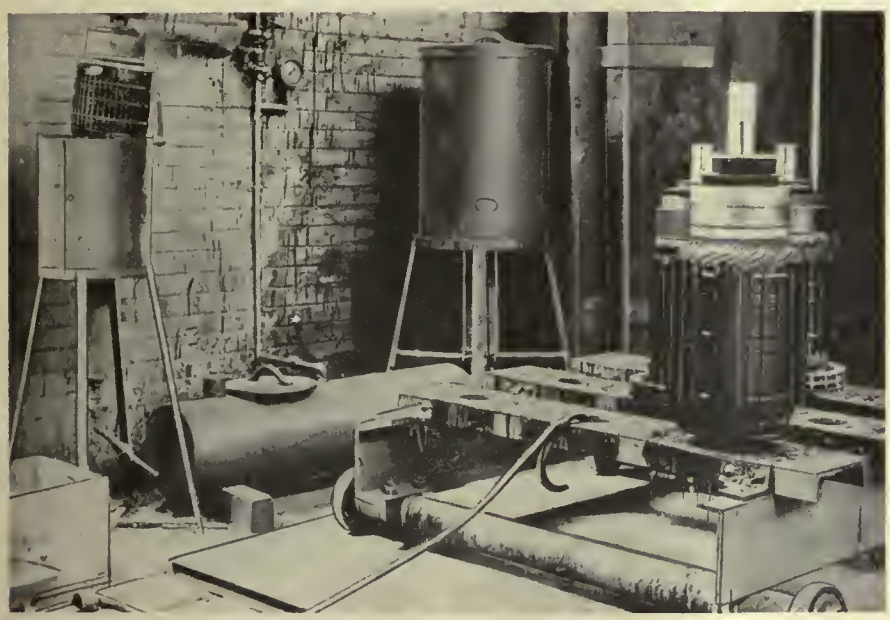
Asphalt mastic flooring makes this substation safe for attendants

TWO interesting construction features have been employed in the new downtown substation of the Market Street Railway, San Francisco, Cal. One is the main floor covering of asphalt mastic, a material with high insulation qualities. It is capable of withstanding a potential of 12,000 volts and makes the floor safe for substation employees. The other feature is a roof of glass, which makes the station more pleasant by permitting the sunlight to enter.

Maintenance Methods *and* Devices

Armature Varnish Stored in Closed Receptacle

VARNISH used in the dipping and baking process for armature treatment as employed in the shops of the Dallas Railway & Terminal Company, Dallas, Tex., is stored in an airtight drum when not in the dipping vats. The apparatus developed in these shops for doing this is operated by the shop air pressure of 90 lb. The dipping varnish is used in a 25-gal. horizontal tank at the floor level. Pipe connections are made between the ends of the tank and receptacles or vats of sufficient size to accommodate both compressor and motor armatures. The vats are set up on legs approximately 3 ft. in length. The air pressure is applied to the drum at the floor level, forcing the varnish into either one or both of the vats, depending upon which control valve is opened. The armature to be dipped is handled by overhead telfer and lowered into the dipping vat. The height of liquid on the armature is controlled by the air valve on the admission line. After the armature has been fully impregnated the air pressure on the drum is released and the varnish permitted to flow by gravity back into the drum. The connecting valve between the drum and the vat is closed and the varnish is thus inclosed in an airtight container. This method is said to reduce the amount of scum developed on the varnish and offers a positive means of controlling the extent of the dipping. In this process the company does not use collars to protect the lower end of the shaft; a piece of waste is used to wipe off the shaft while the armature is suspended above the dipping vat after being impregnated.



Equipment used in the shops of the Dallas Railway & Terminal Company for dipping and baking armatures

Two vats, mounted approximately 3 ft. above the floor, are supplied with dipping varnish from the horizontal tank at the floor level. Air pressure admitted to this horizontal tank forces the varnish into either or both of the dipping vats. The truck in the foreground has ball-bearing wheels and moves freely with its capacity of nine armatures. The baking oven is to the right of the large dipping vat.

In connection with the baking process, the company uses a ball-bearing truck made up of odds and ends from the shop. Old car axles are used and the frame is built of channel section. Holes bored in the web of the three-channel cross-members receive the shafts of the armatures to be baked. Large ball bearings of 6 in. outside diameter are used for wheels. The truck, when filled with nine armatures (its capacity) is easily wheeled in and out of the baking oven, which is adjacent to the dipping vats.

Reclaimed Bus Oil Used for Car Lubrication

By H. C. Pressler
Master Mechanic Eastern Texas Electric Company, Beaumont, Tex.

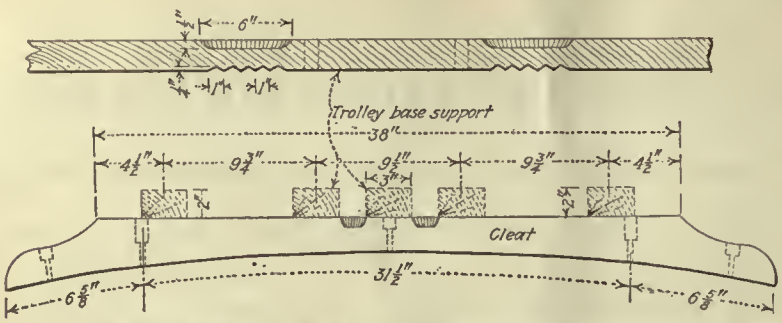
USE of reclaimed bus oil for lubrication of electric cars is the practice of the Eastern Texas Electric Company. After the oil has run its allotted time in the buses it is drained off and poured into a 50-gal. barrel. A piece of heavy felt is fitted over the top of the barrel so that the oil must strain through it. All carbon and foreign matter are thus removed and the oil comes out clear and with good body. With this oil used in journal bearings no trouble has been experienced. The wool waste does not get gummy and hard and pack away from the journal, but keeps loose and fluffy, which keeps it close on the bearing. The oil is used also on brakes.

Overcoming Short Circuits at Trolley Bases

By Otto Gottschalk
Engineer of Railway Equipment Havana Electric Railway, Havana, Cuba

GROUNDS between trolley bases and the steel roof supports on cars operated by the Havana Electric Railway caused considerable trouble. This was aggravated through the use of a metallic return which requires two trolley bases mounted close together on two trolley boards of equal width. Short circuits were caused by a current creepage over the surface of the boards and cleats of wood under the trolley boards. Dirt, rust and a salt deposit accumulated and the heavy rainstorms which take place in this climate during the summer months caused a film of water along the boards. The hot sun of Cuba also produced warping of the boards, so that they had a shallow dish shape and thus were ready receptacles for dirt and moisture.

Ordinary air drying insulating varnish was used to cover the wooden boards, but it was found that it would not adhere to them long enough to be effective and prevent the wood from becoming water soaked. This difficulty was overcome by painting the surfaces with baking varnish. This does not scale or crack and it does not



Trolley base support as used by the Havana Electric Railway

become hard and dried out by the hot sun. In addition a special construction is used to support and insulate the trolley bases, as shown in the accompanying illustration. The base supports are made of native hard wood and attached securely to cleats of the same material by using aluminum wood screws. These screws do not rust and they give greater strength than brass.

The cleats of the structure are attached to the steel roof supports by carriage bolts. The heads of these are countersunk into the cleats and the holes are then filled with baking varnish. The supports which hold the bases are cut on the upper side and in between the bases and the cleats so that an angular surface is formed similar to a house roof. This causes water to run off rapidly. On the under side of the supports and directly below the angular surface saw teeth are cut. These break up a continuous stream of water that may take place and cause short circuits. The cleats in close proximity to the bases are also angled to prevent current creepage. Another advantage from this construction is that the weight is reduced 40 per cent over the construction previously employed.

Brake Relining Machine Reduces Maintenance Cost

FORMERLY the El Paso Electric Company, El Paso, Tex., had bus brakes relined at a local brake service station. A mechanic from this garage had to remove the brake bands from the bus, make a trip to the office of the master mechanic for an order to have the work done, then take the bands to the brake service station. There he had either to wait for the work to be done or return later for the brake band. Meanwhile the bus was out of service. It sometimes happened that the brake service station could not do the work at once, and often a bus would be tied up for an entire day.

According to the company's brief for the 1927 Coffin Prize, this method proved so inefficient that a brake lining machine was installed in the company's own garage. The cost was only $102.83, but the expense of relining brakes on the nine buses for twelve months was cut from $349.62 to $228, or a saving of $121.62. In addition the necessity of holding buses out of service to reline brakes has been eliminated.

Eleven Suggestions for Better Commutation

By W. J. Walker

Railway Supply Department, General Electric Company

SATISFACTORY operation of railway motors depends largely on the care and attention given the commutators. One large railway motor manufacturer recommends that the following suggestions be carried out in order that successful commutation may be obtained:

1. Keep commutator mica segments undercut or grooved. The cutting depth should be about 3/64 in.
2. Keep the commutator surface smooth.
3. Use the best grade of brush, made of highest quality materials. The selection of the brush depends upon local conditions and the design of the motor.
4. Do not allow oil to come in contact with the commutator surface or the carbon brushes.
5. Adjust the bottom of the carbon box so that it will be between ⅛ in. and ¼ in. from the commutator surface.
6. See that the brush fits the carbon way without excessive clearance, but is free to move in response to the brush pressure arms. The maximum clearance between a new brush and new carbon way is 0.008 in. The clearance should not be allowed to exceed 1/32 in.
7. Replace worn carbon ways promptly. For older types of brush-holders, with the body and carbon way cast in one piece, consult the manufacturer for information regarding the substitution of modern units equipped with renewable carbon way boxes and steel clock-spring pressure arms. Improved types of brush-holders are available for a majority of the older railway motors, and their use means better commutation and more economical operation.
8. Clean the brush-holders and supports regularly. Moisture or dust on any part of the brush-holder or support may be the cause of electrical breakdowns.
9. Keep the bearing linings in good condition so that the armature air gap will be maintained uniformly. This will minimize the movement of the armature in going over rough track, which is frequently the cause of flashovers.
10. Maintain proper brush pressure and use the grade of brush recommended by the equipment manufacturer.
11. Keep track and roadbed in good condition. A rough track is the cause of many commutation troubles.

Machine for Removing Paint from Car Seats

PAINT on the slat seats of the cars of the London County Council, London, England, is removed prior to refinishing by means of a machine evolved for the purpose. Not all seats on its cars are of wood, some being upholstered, but there is a sufficient number of slat seats to warrant the construction of a machine of this kind.

The seats are first dipped in a tank containing a paint remover. They



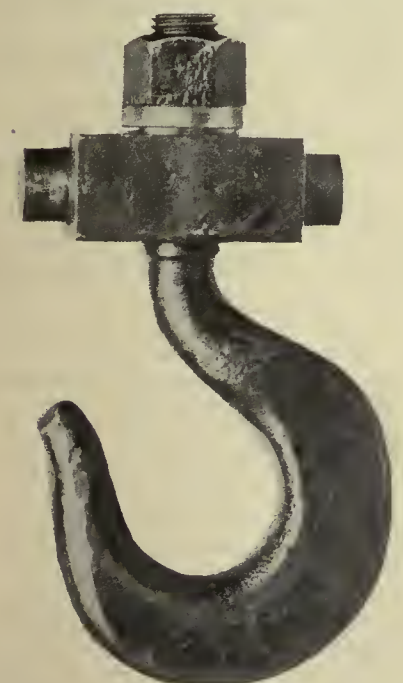
These brushes remove paint from car seats in London

are then slid along a work table under two sets of revolving brushes, one of wire and the other of bristles, which thoroughly remove the paint. These brushes are shaped to fit the contour of the seats. The wire brushes remove the greater part of the paint. The remaining particles of paint are taken off by the bristle brushes. The brushes are covered with metal guards to prevent the particles of old paint flying about the room.

New Equipment Available

New Sizes Added to Line of Roller Bearing Crane Hooks

POPULARITY of crane hooks manufactured by the Rollway Bearing Company, Inc., New York, N. Y., has made it advisable to revise the list of sizes and add a number of new ones which will prove more convenient to customers than sizes previously listed, according to an announcement of that company. Crane hook bearings are now furnished in sizes to fit standard hooks with capacities from 5 to 100 tons. Larger sizes to fit the largest hook shank can also be furnished, but on these larger sizes the diameter of the shank and the permissible outside diameter of the bearing should be specified.



Rollway bearing as used on crane hook

The rollers and thrust plates in these bearings are made of high carbon alloy steel, heat treated. This insures uniform hardness throughout the piece and results in greater dependability than can be expected from a case-hardened piece. The large area of contact between rollers and plates prevents indentation sometimes found with ball bearings used on crane hooks and thereby insures free movement of the hook under heavy load.

A "dip and bake" every 500 days
Will keep down your car delays.

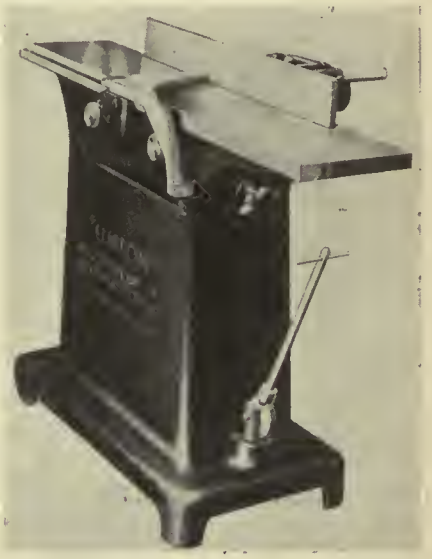
Twist Drill Grinding Attachment

GRINDING of twist drills accurately is possible by use of an attachment interchangeable with the standard tool grinding rest of Hisey grinders. The device has just been announced by the Hisey-Wolf Machine Company, Cincinnati, Ohio. This attachment not only will result in more accurate grinding of the drills but also will produce a saving in time over the old and obsolete free-hand method. It eliminates the use of gages, as a graduated micrometer screw adjustment insures identical lip lengths.

A 60-grit grinding wheel of medium grade is recommended for this work and should be dressed frequently so as to retain a straight face. The attachment will hold twist drills with either straight or taper shanks from $\frac{1}{4}$ in. to $1\frac{1}{4}$ in. diameter.

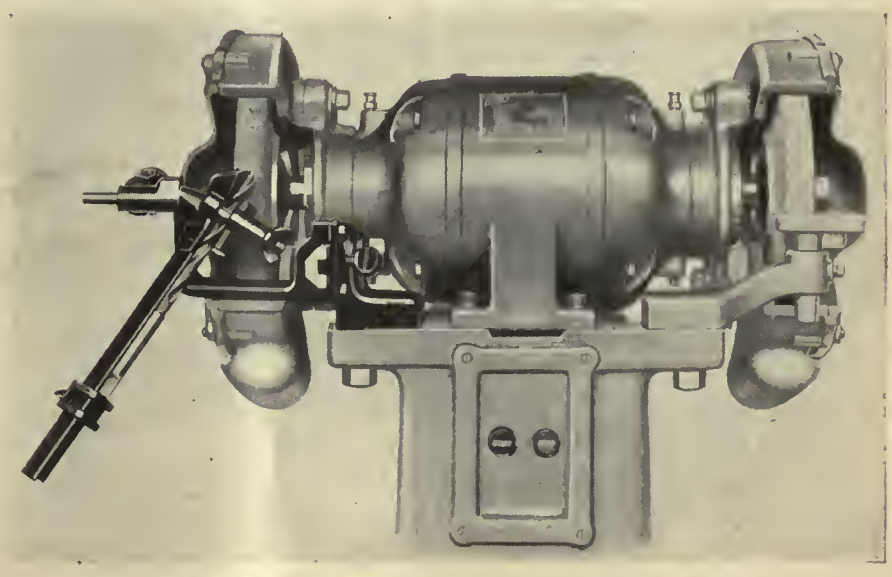
Small Portable Type Pedestal Mounted Jointer

AN 8-IN. jointer mounted on a portable truck type pedestal base is a new product of the Gallmeyer & Livingston Company, Grand Rapids, Mich. The machine is 44 in. over all, with 24-in. front table and 18-in. rear table. The rabbeting groove in the rear table and the vertical adjustment of the front table make it possible to rabbet up to $\frac{1}{2}$ in. on this machine. Both front and rear tables can be adjusted.



Motor-on-arbor 8-in. jointer mounted on truck base for portability

The machine is equipped with ball bearings and a motor mounted on the arbor. A three-knife safety cylinder carries three knives $8\frac{1}{4}$ in. long. The fence is adjustable and the knives are guarded carefully.



Twist drill grinding attachment fitted to 10-in. wheel grinder

Association Activities

Iowa Operators Discuss Rail and Bus Service

WHEN buses are indicated by all the operating conditions, but their adoption involves the virtual scrapping of a heavy rail investment, which way is the operating company to turn? This problem, propounded in a paper given by D. D. Bentzinger, assistant to general manager Iowa Southern Utilities Company, brought out a discussion that was one of the high points in the annual convention of the Operators' Section, Iowa Electric Railway Association, held on Nov. 2 and 3 at Davenport, with nearly 150 members and guests in attendance.

The maintenance men had their innings also. Papers by Henry Cordell, master mechanic Chicago, North Shore & Milwaukee Railroad, on the elimination of equipment failures, and by W. L. Wilson, chief engineer maintenance of way Des Moines City Railway, on methods of track construction and maintenance followed on his city and interurban properties, excited keen interest in the form of a flood of experience details explained by C. M. Feist, master mechanic Sioux City Service Company; R. H. Findley, chief engineer Omaha & Council Bluffs Street Railway Company; W. G. Lamb, master mechanic Waterloo, Cedar Falls & Northern Railway; F. V. Skelley, superintendent of equipment Des Moines City Railway, and others.

Keeping the Lines Clear

In addition to Mr. Bentzinger's paper, bus operation was discussed by several speakers. A. P. Lewis, general superintendent Rockford & Interurban Railway and Rockford City Traction Company, told how snow storms have been made to pay profits, as well as to demonstrate the practical effect of co-ordination. Four Fordson tractors, purchased last November, were sent out ahead of the trolley sweepers, lowered materially the sweeper maintenance cost, and also enabled both cars and buses to operate on schedule for the first time, contributing materially, it was believed, to the passage of a favorable franchise shortly after the first storm of the winter.

Joint rail and bus service in Dubuque and East Dubuque was described by A. H. Smith, superintendent Dubuque Electric Company. In a city of walking distances, such as Dubuque, a special effort must be, and is, made to keep to schedules. The practice is followed of replacing defective cars or buses at points along the route. This avoids an open schedule caused by bringing units in for repairs. The system of bus maintenance and operation is patterned after that followed by the electric railway, according to Mr. Smith. Bus operators are also car operators, and repair men are shifted from one department to the other as the occasion may demand, hence the advantage of co-ordination. Seven buses are operated on two routes—one serving a residential area radiating fanwise from downtown Dubuque, and the other crossing the Mississippi River into East Dubuque. For these routes there are used, respectively, 25-passenger Macks and 16-passenger Dodge-Grahams. Losses with these buses are less than they would be if cars were operated, Mr. Smith asserted, and "we avoided building car line extensions long expected and requested numerous times."

A history of the gas-electric drive in bus service was presented by W. A. Clough, General Electric Company, Chicago. There are now in operation or on order 1,453 buses fitted with G.E. electric drive, of which one each is in India, England and Germany. An engine with modified torque characteristics was needed for the best results, he indicated. Electric braking had no place on a bus, was his personal opinion, although it might be improved by the use of a contactor and blowout instead of the present controller construction. He gave estimates of operating expense to show that under certain assumed conditions a group of ten buses with electric drive could run for 32.4 cents a mile, while the mechanical type would cost 34.6 cents a mile.

The circulating load method of handling passengers was advocated in a paper delivered by R. S. Frehse, sales engineer National Pneumatic Company, Chicago. Treadle interlocks had removed any possibility of the door being closed on a passenger, he said in answer to a question. Sixty operating companies are now using some 5,000 pneumatic door controls, on 3,000 trolleys and 216 buses.

Freight as a Source of Interurban Revenue

Freight as a means of building up interurban revenue was discussed in a paper by C. F. Dege, general superintendent Clinton, Davenport & Muscatine Railway. One-man operation, remodeling of cars, faster and more frequent schedules were adopted to stem the tide of decreasing passenger business, but had resulted to date only in retarding the rate of decrease of revenue, rather than in increasing that revenue. The only hope was in building up freight revenue, if the continuance of operation was to be warranted. Mr. Dege told of the changes required to do this: Freight-handling motors and locomotives had to be bought; sidings and stock yards provided; transfer connections with steam roads built; through rates and divisions established with connecting carriers. Above all, each member of the organization had to become a salesman, and the business, once secured, had to be handled so that it would be kept in the future. In ten years the gross tonnage of freight had been increased six times because of determined efforts. In 1916 the company handled 30,432 tons of less-than-carload and carload freight, while in 1926 the gross was 194,586 tons. This field had only been touched, Mr. Dege was convinced, and was destined to become the major part of the operation.

Mr. Bentzinger went even further

COMING MEETINGS OF *Electric Railway and Allied Associations*

Nov. 16-17—**Central Electric Traffic Association, Keenan Hotel, Fort Wayne, Ind.**

Nov. 17—**Central Electric Railway Accountants' Association, Keenan Hotel, Fort Wayne, Ind.**

Nov. 17-18—**American Society Mechanical Engineers, annual meeting, Engineering Societies Building, 29 West 39th Street, New York, N. Y.**

Nov. 17-18—**Personnel Research Federation, Accident Reduction section, 40 West 40th Street, New York, N. Y.**

Nov. 28-30—**American Institute of Electrical Engineers, regional convention, Drake Hotel, Chicago, Ill.**

Dec. 1, 2—**Pennsylvania Street Railway Association, annual meeting, Scranton, Pa.**

Dec. 2—**American Institute Electrical Engineers, New York Section, Engineering Societies Building, New York, N. Y.**

Dec. 2—**Metropolitan Section, American Electric Railway Association, Engineering Societies Building, New York, N. Y.**

Jan. 16-17—**Midwest Electric Railway Association, Hot Springs, Ark.**

Jan. 25-27—**Electric Railway Association of Equipment Men, Southern Properties, Roosevelt Hotel, New Orleans, La.**

Jan. 26-27—**Central Electric Railway Association, Cincinnati, Ohio.**

Jan. 31—**New York Electric Railway Association, annual meeting, Hotel Commodore, New York, N. Y.**

than indicated in the opening paragraph of this report. It was his opinion, received without comment, that further development of transportation systems in communities such as Burlington and Ottumwa (both of about 30,000 population) could not be justified. His own company felt a moral obligation to render the service, or would willingly abandon it at any time. Operating figures indicated, he said, that if relieved of the cost of furnishing and maintaining paving over the car routes, the company could operate street cars cheaper than it could buses. In Burlington, over a two-year period, and a total of 700,000 miles, nine 25-passenger buses had averaged 15.25 cents a mile. This figure included depreciation on a 250,000-mile basis, but did not cover garage rental. Mechanically, the modern bus is entirely satisfactory, his experience being that the statements of the manufacturers regarding operation are justified.

Using Burlington as an example, Mr. Bentzinger asked for discussion as to what the transportation company should do when a five-year paving program, to cost $250,000, was staring it in the face. Should the company continue to pour money into a well that apparently had no bottom? Or should it charge off the million-dollar investment in a trolley system, and go over to all-bus operation? A bitter pill, but the sooner swallowed, the better, was the verdict of B. W. Arnold, assistant to the general manager Chicago, North Shore & Milwaukee Railroad. The layout of the city, as well as its population, must be considered, suggested R. J. Smith, vice-president Tri-City Railway of Iowa. It might be worth while in Burlington to continue a trunk trolley line and abandon the others. The experience of the Iowa Railway & Light Company was outlined by E. F. Winslow, superintendent of transportation. Two years ago interurban headway between Cedar Rapids and Mount Vernon had been lengthened from one hour to two hours, with buses filling in the alternate hour. This had not increased the riding, so now the rails were being torn up.

John Sutherland Retires

At the banquet, which was one of the entertainment features, the delegates were welcomed by R. B. MacDonald, president of the Tri-City Railway of Iowa, who expressed the hope that the convention would give them renewed zeal so they could go home and solve the many problems of the industry. John Sutherland, retiring after ten years as chairman of convention, was presented with a Masonic diamond ring, from the members of the Operators' Section, the ceremony being performed by Maurice Welsh, chairman of the executive committee. Another feature was a trip of inspection through the Tri-City shops in Davenport and Rock Island, carried out with the help of the outdoor bus exhibit, which included demonstration vehicles shown by Bender, Murray, both on White chassis, Yellow, Twin Coach, Mack and Studebaker. During the closing business session, after the matter had been explained by B. W. Arnold, the section voted to support, individually and as a body, the legislation regulating interstate motor carriers of passengers, to be submitted at the next session of Congress. E. J. Anderson, general superintendent Tri-City Railway, was elected chairman of convention for the next year, it was announced. Maurice Welsh of Waterloo was re-elected chairman of the executive committee, as were the following members: R. W. Herrick, Sioux City; F. S. Welty, Omaha; E. W. Miller, Des Moines; A. H. Smith, Dubuque; Charles F. Weil, Chicago; Robert Sampson, Mansfield, Ohio; K. A. Hills, Davenport, and G. J. Hart, Pittsburgh.

Freight Is Becoming a Major Source of Revenue*

By C. F. Dege

General Superintendent Clinton, Davenport & Muscatine Railway, Davenport, Iowa

FOR some time it has been apparent that the only hope of this company to secure enough revenue to warrant its continued operation was through an increase in freight business, and for this reason the company has been making a vigorous effort to secure such business. This has required a great change in our methods of operation, because, like many other interurbans, we had been depending almost entirely on passenger business and had handled very little freight.

Freight locomotives were purchased, sidings were provided, transfer connections with the steam roads built and through rates and divisions established with connecting carriers. Stock yards were built and service started to put the interurban in a position to solicit the business.

We had to change the attitude of every man on our property so that people in our territory would like to do business with us. From the general manager down through the ranks, we all have tried to make salesmen of ourselves and to establish good public relations. Nothing can take the place of personal contact to promote good public relations. We drop in to see our patrons and meet the public officers of the various communities in our territory in a casual way and talk over matters of mutual interest.

We have had some success in having our employees solicit freight and passenger business. Our failure to give good service is often detected by these employees and action is then taken to eliminate further cause for complaint. We have a regular freight solicitor who covers each community in our territory about once each month. In addition our several department heads devote part of their time to soliciting freight.

Our freight service consists of two freight trains daily except Sunday in each direction over each division. For rush shipments we give passenger car package service every hour and a half at a rate a little higher than the regular freight rate. This service has proved very popular and has given us a substantial increase in revenue.

Claims for lost or damaged freight are highly undesirable and we have done much in the last few years to reduce the amount of money lost in that way. Our men are taught how to stow freight in the cars and how to handle it to avoid damage. They are required to make reports to show cause when freight is damaged, and to avoid making the reports they handle the freight more carefully. Careful inspection of all goods must be made by the receiving and delivery clerks and notations made on the bills of lading or delivery receipts when loss or damage is noticed. Fair claims must be paid quickly and unfair claims declined just as quickly.

Time seems to be the most important element today in handling freight. Business houses carry smaller stocks today and depend on fast freight service. Delays at transfer points are being cut to a minimum, freight being available for delivery immediately on arrival. The consignee is notified of the arrival of his goods at once, because if that notification is delayed all efforts to hasten the shipment over the line are wasted.

Any change in our freight schedules is made known to our patrons through bulletins to their traffic managers and shipping clerks. We keep the shipping association and traffic clubs advised of our activities and invite people to call our agents and tariff clerks for rates and routing information.

The freight business is destined to become our major operation. As an example of what can be done in building up freight business, I will give you a few figures to show the result of our efforts along that line. In 1916 we handled a gross freight tonnage of 30,432, including both less-than-carload and carload. In 1926 our gross tonnage increased to 194,586, more than six times as much freight as in 1916. In September this year we handled 27,812 tons on the Clinton Division alone, almost as much as we handled on both divisions in 1916.

In a word, we were driven to look to a new source for our major revenue, and feel real encouragement from our comparatively recent efforts to develop that source. Many complications are brought into management and operation by the intensive development of this freight business, but they seem well worth while in view of the possible revenue to be derived.

**Abstract of a paper presented at the annual convention of the Operators' Section, Iowa Electric Railway Association, Davenport, Iowa, Nov. 2 and 3, 1927.*

Rail Executives Meet at Purdue on Nov. 11

BETWEEN 200 and 250 railway executives from throughout the United States and Canada are expected at Purdue University on Nov. 11 to inspect the research work being conducted by the university's engineering experiment station for the American Railway Association on the testing of air-brake equipment and draft gears. The air-brake tests have been under way nearly two years, under the direction of Harley A. Johnson, director of research for the Railway Association, and also general manager of the Chicago Elevated Railroads. The draft gear tests were started last spring at the Purdue Engineering Experiment Station.

American Association News

More Engineering Committees Announced

FURTHER appointments of committees of the Engineering Association have been announced at association headquarters. These include both standing committees and special committees of the various divisions that have been set up to cover the technical work of the association. The four technical standing committees in charge of these divisions were announced in this paper for Oct. 29, page 833. The additional appointments follow:

EDITING OF PROCEEDINGS AND REPORTS

F. H. MILLER, vice-president and general manager Louisville Railway, Louisville, Ky., chairman.
E. M. T. RYDER, New York, N. Y.

ENGINEERING MANUAL

F. H. MILLER, vice-president and general manager Louisville Railway, Louisville, Ky., chairman.
L. D. BALE, Cleveland, Ohio.
E. M. T. RYDER, New York, N. Y.

REVISION OF CONSTITUTION AND BY-LAWS

W. W. WYSOR, chief engineer United Railways & Electric Company, Baltimore, Md., chairman.
F. McVITTIE, Rochester, N. Y.
F. H. MILLER, Louisville, Ky.

SUBJECTS

P. V. C. SEE, superintendent car equipment Northern Ohio Power & Light Company, Akron, Ohio, chairman.
L. D. BALE, Cleveland, Ohio.
C. H. JONES, Michigan City, Ind.
W. W. WYSOR, Baltimore, Md.

HEAVY ELECTRIC TRACTION

H. F. BROWN, assistant electrical engineer New York, New Haven & Hartford Railroad, New Haven, Conn., chairman.
A. H. ARMSTRONG, Schenectady, N .Y.
J. M. BOSENBURY, Springfield, Ill.
MORRIS BUCK, New York, N. Y.
S. B. COOPER, East Pittsburgh, Pa.
A. H. DAUS, Chicago, Ill.
J. C. DAVIDSON, Schenectady, N. Y.
J. H. DAVIS, Baltimore, Md.
J. V. B. DUER, Altoona, Pa.
J. T. HAMILTON, New York, N. Y.
J. W. HULME, New York, N. Y.
E. C. JOHNSON, Los Angeles, Cal.
M. W. MANZ, Mansfield, Ohio.
L. S. WELLS, New York, N. Y.
L. C. WINSHIP, North Adams, Mass.

Power Division

SPECIAL COMMITTEE NO. 2—POWER RECTIFIERS

H. W. CODDING, assistant engineer Public Service Production Company, Newark, N. J., chairman.
C. A. BUTCHER, East Pittsburgh, Pa.
C. L. DOUB, Philadelphia, Pa.
F. W. PETERS, Schenectady, N. Y.
W. S. RICHHART, Fort Wayne, Ind.
G. I. WRIGHT, Philadelphia, Pa.

SPECIAL COMMITTEE NO. 4—SWITCHBOARDS

C. E. BENNETT, general engineer Georgia Power Company, Atlanta, Ga., chairman.
C. A. BUTCHER, East Pittsburgh, Pa.
H. J. CASEY, Baltimore, Md.
F. W. PETERS, Schenectady, N. Y.

SPECIAL COMMITTEE NO. 5—CATENARY SPECIFICATIONS

DWIGHT L. SMITH, electrical engineer Chicago Rapid Transit Company, Chicago, Ill., chairman.
S. H. ANDERSON, Los Angeles, Cal.
W. H. BASSETT, Waterbury, Conn.
L. W. BIRCH, Mansfield, Ohio.
W. F. HEALY, Cleveland, Ohio.
S. S. HERTZ, New York, N. Y.
JOHN LEISENRING, Springfield, Ill.
W. SCHAAKE, East Pittsburgh, Pa.
A. SCHLESINGER, Indianapolis, Ind.
R. E. WADE, Schenectady, N. Y.

SPECIAL COMMITTEE NO. 6—TROLLEY WIRE WEAR

H. S. Murphy, staff engineer Philadelphia Rapid Transit Company, Philadelphia, Pa., chairman.
J. WALTER ALLEN, Boston, Mass.
S. H. ANDERSON, Los Angeles, Cal.
W. H. BASSETT, Waterbury, Conn.
L. W. BIRCH, Mansfield, Ohio.
M. W. COOKE, Pittsburgh, Pa.
C. L. HANCOCK, New York, N. Y.
A. J. KLATTE, Chicago, Ill.
J. F. NEILD, Toronto, Ont., Canada.
ANGUS SCOTT, Cleveland, Ohio.
G. F. WENNAGEL, Baltimore, Md.

SPECIAL COMMITTEE NO. 7—INDUCTIVE CO-ORDINATION AND RADIO INTERFERENCE

W. J. QUINN, electrical engineer Third Avenue Railway System, New York, N. Y., chairman.
S. H. ANDERSON, Los Angeles, Cal.
D. D. EWING, Lafayette, Ind.
J. F. NEILD, Toronto, Ont., Canada.
A. SCHLESINGER, Indianapolis, Ind.

SPECIAL COMMITTEE NO. 8—TROLLEY WIRE REELS

J. F. NEILD, electrical engineer Toronto Transportation Commission, Toronto, Ont., Canada, chairman.
W. H. BASSETT, Waterbury, Conn.
C. L. HANCOCK, New York, N. Y.
K. J. KEITH, Des Moines, Iowa.
A. J. KLATTE, Chicago, Ill.
D. L. SMITH, Chicago, Ill.

SPECIAL COMMITTEE NO. 10—LIGHTNING PROTECTION

C. E. BENNETT, general engineer Georgia Power Company, Atlanta, Ga., chairman.
A. L. ATHERTON, East Pittsburgh, Pa.
R. E. BEERS, Schenectady, N. Y.
H. W. DAVIS, Utica, N. Y.
S. S. HERTZ, New York, N. Y.
A. D. MCWHORTER, Memphis, Tenn.
A. TAURMAN, Birmingham, Ala.

SPECIAL COMMITTEE NO. 11—DISTRIBUTION SYSTEMS

JOHN LEISENRING, electrical superintendent Illinois Traction System, Springfield, Ill., chairman.
A. J. KLATTE, Chicago, Ill.
H. S. MURPHY, Philadelphia, Pa.
J. F. NEILD, Toronto, Ont., Canada.
A. SCHLESINGER, Indianapolis, Ind.
ANGUS SCOTT, Cleveland, Ohio.

SPECIAL COMMITTEE NO. 12—FERROUS AND NON-FERROUS MATERIALS

H. S. MURPHY, staff engineer Philadelphia Rapid Transit Company, Philadelphia, Pa., chairman.
MERLE ALDRICH, Michigan City, Ind.
L. W. BIRCH, Mansfield, Ohio.
H. F. BROWN, New Haven, Conn.
C. L. HANCOCK, New York, N. Y.
S. S. HERTZ, New York, N. Y.

Purchases and Stores Division

SPECIAL COMMITTEE NO. 1—REVIEW OF MANUAL

J. FLEMING, assistant secretary and purchasing agent Capital Traction Company, Washington, D. C., chairman.
C. A. HARRIS, Pittsburgh, Pa.
A. E. HATTON, Pittsburgh, Pa.

SPECIAL COMMITTEE NO. 2—STUDY OF ADVANTAGES OF UNIT PILING

W. E. SCOTT, superintendent of supplies Philadelphia Rapid Transit Company, Philadelphia, Pa., chairman.
B. W. FORKNER, Mansfield, Ohio.
F. A. JORDAN, Atlanta, Ga.

T. H. McGarry, Boston, Mass.
W. J. Walker, Schenectady, N. Y.
A. E. Hatton, Pittsburgh, Pa.

Special Committee No. 3—Investment Material and Supplies

C. A. Harris, chief of stores Philadelphia Company and allied corporations, Pittsburgh, Pa., chairman.
A. S. Duncan, East Pittsburgh, Pa.
A. L. Fischer, Cincinnati, Ohio.
W. P. McArdle, New York, N. Y.

Rolling Stock Division

Special Committee No. 1—Manual Review

W. C. Bolt, superintendent rolling stock and shops Eastern Massachusetts Street Railway, Chelsea, Mass., chairman.
W. S. Adams, Philadelphia, Pa.
T. H. Nicholl, Anderson, Ind.

Special Committee No. 3—Car Design

H. H. Adams, superintendent shops and equipment Chicago Surface Lines, Chicago, Ill., chairman.
H. S. Williams, Detroit, Mich., vice-chairman.
O. W. Basquin, Chicago, Ill.
J. A. Brooks, Philadelphia, Pa.
C. A. Burleson, Schenectady, N. Y.
W. J. Clardy, East Pittsburgh, Pa.
L. J. Davis, Brooklyn, N. Y.
Charles Gordon, New York, N. Y.
W. L. Harwood, Springfield, Mass.
A. P. Jenks, Chicago, Ill.
A. L. Kasemeier, Winton Place, Ohio.
G. L. Kippenberger, St. Louis, Mo.
John Lindall, Boston, Mass.
C. R. McMahon, Oakland, Cal.
W. R. McRae, Toronto, Ont., Canada.

Special Committee No. 4—Lighting

R. W. Cost, commercial engineering department, Westinghouse Lamp Company, Bloomfield, N. J., chairman.
A. L. Broe, Harrison, N. J.
W. W. Brown, Brooklyn, N. Y.
H. F. Deininger, Philadelphia, Pa.
E. E. Dorting, New York, N. Y.
H. A. Otis, Chicago, Ill.
J. P. Staples, Charleroi, Pa.

Special Committee No. 6—Lubrication

J. H. Lucas, superintendent of rolling stock Milwaukee Electric Railway & Light Company, Milwaukee, Wis., chairman.
A. A. Green, New York, N. Y.
C. Bethel, East Pittsburgh, Pa.
C. A. Burleson, Schenectady, N. Y.
L. W. Jacques, East St. Louis, Ill.
J. F. Lamb, New York, N. Y.
W. H. McCarty, Washington, D. C.

Special Committee No. 8—Motor Brushes

R. A. Hutchins, motor division, railway equipment engineering department, General Electric Company, Erie, Pa., chairman.
Harry Childs, Clifton, Staten Island, N. Y.
F. W. McCloskey, E. Pittsburgh, Pa.
R. D. Voshall, Washington, D. C.

Special Committee No. 9—Noise Reduction

H. S. Williams, assistant superintendent of equipment Department of Street Railways, Detroit, chairman.
C. Bethel, East Pittsburgh, Pa.
N. R. Brownyer, Detroit, Mich.
R. S. Beers, Schenectady, N. Y.
C. J. Ellis, Winton Place, Ohio.
T. H. Minary, Louisville, Ky.
R. M. O'Brien, New Orleans, La.
H. L. Rogers, Cincinnati, Ohio.
R. D. Voshall, Washington, D. C.

Special Committee No. 11—Current Collecting Devices

Hugh Savage, superintendent of equipment Brooklyn City Railroad, Brooklyn, N. Y., chairman.
W. C. Klein, Allentown, Pa.
H. S. Murphy, Philadelphia, Pa.
D. L. Smith, Chicago, Ill.
W. Schaake, East Pittsburgh, Pa.
R. E. Wade, Schenectady, N. Y.

Special Committee No. 13—Limits of Wear

D. F. Smith, railway engineering department, General Electric Company, Erie, Pa., chairman.
J. M. Bosenbury, Springfield, Ill.
C. Bethel, East Pittsburgh, Pa.
J. H. Lucas, Milwaukee, Wis.
W. R. McRae, Toronto, Ont., Canada.

Way and Structures Division

Special Committee No. 1—Manual Review

W. R. Dunham, Jr., executive engineer Department of Street Railways, Detroit, Mich., chairman.
T. H. David, Indianapolis, Ind.
J. S. Mahan, Chicago, Ill.
D. H. Walker, Indianapolis, Ind.
D. J. Graham, Youngstown, Ohio.

Special Committee No. 2—Special Trackwork

E. M. T. Ryder, way engineer Third Avenue Railway System, New York, N. Y., chairman.
E. P. Roundey, Utica, N. Y., vice-chairman.
C. A. Alden, Steelton, Pa.
J. U. Bragg, Baltimore, Md.
E. B. Entwisle, Johnstown, Pa.
R. B. Fisher, Harvey, Ill.
H. F. Heyl, Easton, Pa.
W. G. Hulbert, New York, N. Y.
M. M. Johnson, New Haven, Conn.
D. H. Payne, Hoboken, N. J.
G. A. Peabody, Cleveland, Ohio.
W. W. Wysor, Baltimore, Md.

Special Committee No. 4—Track Ballast and Drainage

S. Clay Baker, engineer maintenance of way East St. Louis & Suburban Railway, East St. Louis, Ill., chairman.
E. J. Archambault, Milwaukee, Wis.
L. T. Botto, San Antonio, Texas.
A. C. Eddy, Vancouver, B. C., Canada.
C. L. Hawkins, St. Louis, Mo.
J. H. Haylow, Memphis, Tenn.
A. F. Smith, Allentown, Pa.

Special Committee No. 6—Arc Welding

C. F. Gailor, consulting engineer, New York, N. Y., chairman.
E. E. Barnard, Lynchburg, Va.
H. E. Bean, Syracuse, N. Y.
C. A. Burleson, Schenectady, N. Y.
A. M. Candy, East Pittsburgh, Pa.
H. H. Dartt, Scranton, Pa.
A. L. Donnelly, New Haven, Conn.
R. B. Fehr, Detroit, Mich.
E. P. Goucher, Washington, D. C.
E. L. Lockman, Boston, Mass.
W. M. Raiguel, Philadelphia, Pa.
Jonathan Wolfe, Chicago, Ill.

Special Committee No. 7—Alloy Steels Other Than Manganese for Special Trackwork

A. T. Spencer, general superintendent of construction and maintenance Montreal Tramways, Montreal, Que., Canada, chairman.
R. B. Fehr, Detroit, Mich.
F. G. Hibbard, Milwaukee, Wis.
P. A. Kerwin, Detroit, Mich.
B. P. Legare, San Francisco, Cal.
R. H. Noderer, Johnstown, Pa.
O. C. Rehfuss, Montreal, Que., Canada.
N. E. Salsich, Bethlehem, Pa.

Special Committee No. 8—Pavement

A. E. Harvey, superintendent of construction Kansas City Public Service Company, Kansas City, Mo., chairman.
N. R. Alexander, Chicago, Ill.
C. W. Burke, Brooklyn, N. Y.
W. G. Matthews, Denver, Col.
J. H. Sundmaker, Cincinnati, Ohio.
W. L. Wilson, Des Moines, Iowa.

Special Committee No. 11—Track Construction

C. L. Hawkins, engineer of way and structures United Railways of St. Louis, St. Louis, Mo., chairman.
W. R. Dunham, Jr., Detroit, Mich.
H. H. George, Newark, N. J.
E. P. Goucher, Washington, D. C.
E. M. T. Ryder, New York, N. Y.

Special Committee No. 12—Rail Corrugation

W. W. Wysor, chief engineer United Railways & Electric Company, Baltimore, Md., chairman.
C. H. Clark, Cleveland, Ohio.
E. B. Entwisle, Johnstown, Pa.
D. D. Ewing, Lafayette, Ind.
R. B. Fehr, Detroit, Mich.
H. Fort Flowers, Findlay, Ohio.
C. R. Kinnear, Toronto, Ont., Canada.
T. J. Lavan, Cleveland, Ohio.
E. L. Lockman, Boston, Mass.
A. M. Nardini, Philadelphia, Pa.
J. Ormondroyd, E. Pittsburgh, Pa.
H. J. Tippett, New Haven, Conn.
C. L. Van Auken, Chicago, Ill.
H. S. Williams, Detroit, Mich.

Special Committee No. 15—Track Gage

C. H. Clark, engineer maintenance of way Cleveland Railway, Cleveland, Ohio, chairman.
R. S. Bull, Pittsburgh, Pa.
E. P. Roundey, Utica, N. Y.

News of the Industry

Discussion Resumed in Chicago

Disagreement over term franchises holds up the consideration of final traction bill. Attention received by subway matters

THAT subway construction cannot be started in Chicago until the pending traction enabling legislation has been passed was the opinion of several members of the City Council subcommittee which recently resumed consideration of the five new measures designed to solve the local railway problem. Discussion on this point arose when the Aldermen decided to hold a final review of the subway bill which they had approved several weeks ago.

Alderman Joseph B. McDonough, chairman of the City Council committee on local transportation, contended that until the entire set of bills is passed it will be impossible to proceed with the plan of Michael J. Faherty, head of the board of local improvements, to build subways by special assessment. The city must contract for the use of the tubes before they are built, and this will not be done until the whole transit problem is settled, he added.

In this connection, and upon the recommendation of Alderman J. B. Bowler, the sub-committee instructed Assistant Corporation Counsel James W. Breen to draft a bill to transfer the power to build subways by special assessment from the board of local improvements to the City Council. If the board of local improvements submitted a subway plan under the present law, Mr. Bowler declared, the City Council could only accept or reject it, but could not amend it. This, he said, gives the board the sole power to decide where the tubes shall be located and all the specifications of their construction.

The original subway bill approved by the sub-committee provided that the Council can construct the tubes by means of a special assessment and can also decide whether the relocation of public utility pipes and conduits is to be made a part of the subway costs to be paid for by the city or by the public utility affected, or the cost shall be divided among the various interested parties.

A Chicago municipal subway commission, headed by Mr. Faherty, has been in Europe for the past month studying the subway systems of London and the principal continental cities.

Consideration of the fifth and last bill on the traction legislation program, namely, that limiting the length of term franchises, was delayed until Nov. 5 because of the difficulty of the members of the sub-committee to decide whether the measure should provide for an alternative franchise of a limited number of years or leave with the Council the decision as to how many years such a term franchise should run.

In the corresponding bill introduced by the railways in the Legislature last spring a 40-year limit was provided for term franchises. The Aldermen have tentatively struck out that limit, making it possible to have term franchises for 50, 75, 100 or any other number of years. Some Aldermen have pointed out that this would give the City Council power to grant a franchise that might run 100 years without revocation.

Proponents of the no-limit plan replied that bankers will not finance a short-term franchise, and that if the city has the right to issue a 50 or 60-year grant its leverage would be greater on the local companies which want a terminable permit.

Flood Strikes New England Utilities

Power systems in Vermont and New Hampshire hard hit, but recovering rapidly. Major Massachusetts and Connecticut plants escape lightly. Little electric railway damage

WITH the force of a tropical cloudburst, a rainstorm and flood of unprecedented intensity swept through north-central New England on Thursday, Nov. 3, causing a loss of about 150 lives and destroying many millions of dollars' worth of property. Public utility plants in Vermont were overwhelmed, those in northern New Hampshire were also hard hit, and the systems operating in the Connecticut Valley went through a deluge which strained their equipment and personnel close to the limit. No lives are known to be lost among men and women in any branch of the electrical industry.

Despite the damage sustained by the power utilities and the service interruptions, which reached a climax in the Green Mountain region, every dam of major importance held. no plants of primary consequence were irreparably injured, transmission lines of trunk type stood firm, and fine records of service in restoration under the handicap of broken communication by rail, highway and wire were achieved.

Water in the Housatonic River reached a crest Friday. No stations on the Housatonic shut down, and there was very little curtailment of capacity. The crest of the flood passed Spring-



International News Reel

Water poured over the Amoskeag Dam at Manchester, N. H., to a height of 9 ft.



Approach to the power plant of the railway at Hartford was by rowboat

field, Mass., at 5 p.m. Sunday and Hartford Monday at 2 a.m. At Hartford approximately 200,000 sec.-ft. was recorded. All transmission lines were held in service. The Connecticut River at the South Meadow station, Hartford, rose to within 3 ft. of the power-plant openings. At Middletown, Conn., service was cut off for about 24 hours owing to the flooding of substations.

In Connecticut the electric railways suffered from flood conditions along the Connecticut, Mad and Naugatuck Rivers. Considerable damage was done to the roadway and equipment, but the loss of revenue due to suspension of service was an even more severe blow.

At Hartford the Connecticut River rose to unprecedented heights and flooded many streets in the lower part of town. On Nov. 6 water stood 7½ ft. deep in the street outside the power house of the Connecticut Company. It came up nearly to the bottom of the windows and a shut down was feared. Fortunately this did not occur and the station has remained constantly in service. Some injury was sustained by the equipment, however. Just what this will amount to cannot yet be determined, but it is feared that it may be severe. Divers are at present examining the condenser intake and outlet to find the extent of the damage done.

Between Nov. 4 and 9 service was suspended for varying periods on car lines operating in the waterfront district and on several suburban lines. A large part of the town of East Hartford was submerged and electric railway tracks were under water in a number of places. Wherever possible buses were operated over routes on high ground to give partial service to districts ordinarily served by the suspended railway lines.

At Middletown, below Hartford on the Connecticut River, similar trouble was experienced from high water. Car lines running to points outside the town were forced to suspend service, but the local lines were not greatly affected. Serious trouble was experienced at Winsted, on the Mad River, and at Torrington, on the Naugatuck. Waterbury and Derby, also on the Naugatuck, were less seriously affected. At New London, on the Thames, no trouble occurred.

With about 4 ft. of water in the streets of Winsted and a couple of feet in the streets of Torrington, all car service in that district was suspended for several days. At Waterbury the water covered the floor of the Connecticut Company's paint and overhead shops to a depth of 6 in. The boiler room was flooded and the entire plant was without heat. Electric motors in the boiler house and the electric hoisting apparatus in the pits of the overhaul shop were removed in time to prevent damage. Car service in the city of Waterbury, which is considerably above the river, was not interrupted, but the line from New Haven to Waterbury via Derby was discontinued for a time because of high water at Naugatuck. One of the local lines in Derby was also forced to suspend operations.

Service on all Lines Normal

According to R. J. Bennett, assistant general manager of the Connecticut Company, service on all lines has now been restored to normal. Comparatively little damage has been done to the physical property of this company except at the Hartford power station referred to previously. This was largely because of the width of the Connecticut River at its lower end, which prevented the strong and destructive current experienced in its upper stretches. Some damage was done to motors and armatures, but this was not greater than would occur during an ordinary heavy rain, as no attempt was made to operate the cars over submerged track. Bridges were found to be sound by the engineers.

Electric railways in western Massachusetts suffered heavy losses from washouts, submerged tracks, detours and forced suspension of service in some cases. Service between Springfield and Holyoke was interrupted owing to flooded tracks in the Riverdale and Springdale sections and traffic between the two cities was routed by way of Chicopee Falls. On the route from Springfield to Westfield buses replaced cars for a time on Nov. 5 between Tatham and Westfield. Later in the day the tracks were cleared of water, repairs made and regular traffic resumed.

Memorial Bridge at Springfield was closed to traffic Saturday night, Nov. 5, and traffic routed over the North End bridge. The Agawam bridge, over which cars of the Springfield Street Railway are run through Agawam, was closed Friday morning, owing to concern as to its safety, but was reopened on Saturday. According to H. M. Flanders, general manager Springfield Street Railway, the greatest injury suffered by this company was loss of revenue due to suspension of service. Service on the Northampton Street Railway was suspended Saturday between Northampton and Amherst owing to submerged track in the Hadley meadows, and also between Northampton and Easthampton and southward to Mount Tom for the same reason.

Reports sent on Nov. 8 from Springfield, Mass., as a center indicated that service on the Springfield Street Railway would be completely restored on all lines on Nov. 9. Minor washouts had then been repaired. At that time the Holyoke street railway lines were open to all suburban points. The roadbeds on this system were found to be sound after the flood receded. Except for the route from North Adams to Bennington all the Berkshire street railway lines were operating.

$300,000,000 for Subways Approved in New York

Amendment No. 2, which was put forth as a solution of New York City's transit problem, was carried at the election on Nov. 8 by an indicated majority of approximately 140,000. The indicated majority in the five boroughs was 370,000 in favor of the measure, which would enable the city to borrow $300,000,000 beyond its present debt limitations, the money to be used solely for construction of new transit lines, particularly subways. The sweeping victory of the proposal in the city itself was impressive.

Mayor Walker said:

> I am very happy with the vindication at the hands of the people of this city manifested by the wonderful plurality given to Amendment No. 2. Now we can proceed to keep our platform pledges to complete the new subway routes and bring to subway riders of our city the comfort and convenience that has been altogether too long delayed.

Five-Cent Zones and Weekly Passes Ordered in Oakland

A basic 5-cent zone fare on all traction lines of the Key System Transit Company, Oakland, Cal., operative within 30 days or by Dec. 10, has been ordered by the California Railroad Commission. This ruling is in accordance with recommendations of A. G. Mott, chief engineer of the commission, filed on Nov. 2, the last day of the rate hear-

ing which had been in progress intermittently for two years.

The Key System also was ordered to reduce ferry fares from 21 cents to 20 cents and to increase slightly monthly ferry commutation rates and to institute $1 and $1.50 weekly passes good for unlimited use on the so-called traction lines. Operation of one-man cars in the interest of economy also is recommended by the commission, as are 5-cent bargain fares in all former 7-cent zones between the hours of 9 a.m. and 4:30 p.m.

The new fare schedules are experimental and subject to modification from time to time. The rate base of the company as accepted by the commission is $29,101,063 and it is expected that the new rate schedules with suggested economies will increase the company's yearly net income about $1,000,000. Last year's net income was $1,195,079, a return of 4.11 per cent on the rate base.

Boston's New Dorchester Line Opened

$5,000,000 improvement first move in extensive plan under which city lines will take over suburban traffic from steam railroads

ANOTHER important branch has been added to the rapid transit system of the Boston Elevated Railway, Boston, Mass., by the opening, on Nov. 5, of the first section of the Dorchester tunnel extension. This extension runs from Andrew Square, which has been the terminal for some years, to Fields Corner in Dorchester and cost $5,000,000. It is being carried to Mattapan as fast as the work can be done, at an expense of another $5,000,000. To Fields Corner it is completed.

Mayor Malcolm E. Nichols drove the last spike with a gilded hammer on Wednesday, Nov. 2. Then the Massachusetts Public Utilities Department inspected the branch and orally certified to the Boston Elevated Railway that all the relevant laws had been complied with and the new line was safe for operation. On Friday, Nov. 4, there was an official inspection by the Boston Transit Commission, under which the line was built. These ceremonies served to dedicate the new line and at 5:20 o'clock the next morning, Nov. 5, it was opened to the general public for business.

The Boston Elevated crews had been operating empty trains over the new route for some days and were familiar with all the switches, signals, curves and grades, and they started service promptly and held their long four-car trains to schedule, running from Fields Corner to Park Street, in the very heart of Boston, in fourteen minutes. This speed is revolutionary for the Dorchester, Mattapan and Milton people, and in addition to the speed there is the frequency of service—a two and three-minute headway during the morning and afternoon rush for people who have been accustomed to infrequent steam train service to South Station and long walks to their offices. Most of them are brought much nearer to their places of business by being carried to Park Street.

Moreover, the commuters learned that the new line is a heavy, rock-ballasted, third-rail road, smooth riding and quiet. For a long distance the rapid transit tunnel trains run alongside of the main line of the New Haven Railroad, an iron fence separating them. In fact, the roadbed occupied is the former roadbed of the New Haven Railroad, purchased from the railroad by the Boston Elevated. It is the first outstanding bid of the Boston Elevated for the suburban passenger business of the New Haven Railroad and may lead to the abandonment of more of this short-haul business by the steam railroads entering Boston, in order that it may be more advantageously handled by the local railways, mainly the Boston Elevated.

Mayor Nichols says this is only the beginning of a great expansion of the Boston Elevated system. His intention is to go to the Legislature at the next session with a bill for at least $20,000,000 for new rapid transit lines. He wants to take up again the question of a subway under Huntington Avenue to connect the Brookline village with the Boston Elevated tunnel system and to run new lines out in other directions, details of which he has not worked out. "Let's get going," he says. He would have a subway under the Common into the North End and connection with Lechmere Square; he would have the city take over from the Elevated the elevated structure in Atlantic Avenue and use it in part as a highway for heavy trucks, and he expects that another tunnel will have to be built under the harbor to East Boston. Speedy development of the traffic system has become imperative in Boston to keep pace with the requirements. Governor Fuller has recommended that pleasure cars be kept out of the business center from 10 o'clock in the morning until 3 o'clock in the afternoon. General Manager Dana of the Boston Elevated approves of this plan, stating that the Boston Elevated is running light during that period and could handle all the traffic resulting from its adoption. The registrar of motor vehicles, Frank Goodwin, favors it.



Left to right: A. L. Butler, construction engineer of rapid transit Boston Elevated; Col. Thomas F. Sullivan, chairman Boston Transit Commission, and H. M. Steward, superintendent of maintenance Boston Elevated

Railway at Baltimore Concludes Presentation of Testimony

The United Railways & Electric Company, Baltimore, concluded its case before the Maryland Public Service Commission on Nov. 4. The hearing is on a petition asking authority to increase the straight fare from 7½ cents to 10 cents. Recently the commission refused to grant the company a temporary emergency increase pending hearing on the present petition seeking a permanent 10-cent fare.

Bancroft Hill, valuation engineer, was the last witness for the United. The company did not call any witnesses to present testimony to show the necessity for a return of 8 per cent, pointing out that testimony covering this point had been offered at the hearing for an emergency increase and this testimony is a part of the record of the present case.

The commission announced that the hearing will be resumed on Nov. 15, when the people's counsel, organizations and others opposing the increase will begin the presentation of their testimony.

Maine Company Challenges the Transportation World

Considerable interest has been shown in the second industrial exhibit placed in the window of the Chamber of Commerce at Biddeford, Me., by the Biddeford & Saco Railroad. The material on display is valued at more than $500 and it is only a small fraction of the many thousand parts necessary for upkeep and maintenance of the road and no two parts on display are alike. The railroad makes a very pertinent challenge worded:

We challenge you to name another railway in America of like size serving a similar community that is still operating on a 5-cent fare and giving as good service as your own trolley.

Many savings banks own our bonds—you have money in these banks, boost your own investment by riding the street cars. Your local trolley system carried about 1,500,000 passengers last year, and it was an off year here too. Does that sound like a dying industry to you?

More people in America are riding the street car than ever before, why?—because it has been found to be cheaper and safer.

When talking with a visitor, you can justly point with pride to the local railway and its 5-cent fare since 1887.

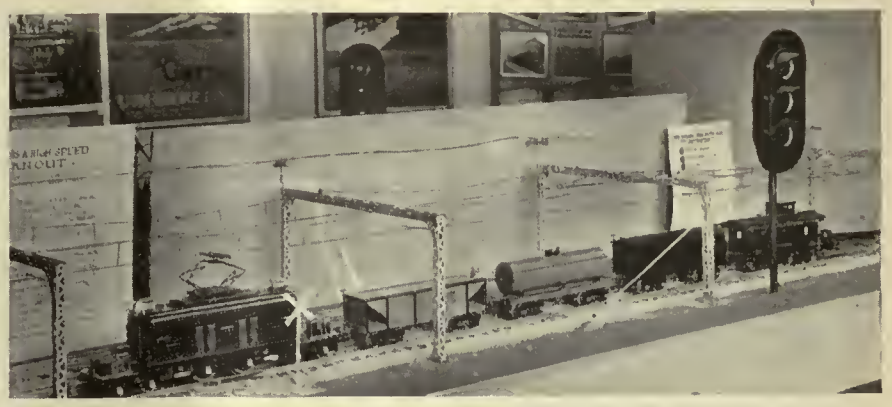
You can ride the street cars as frequently as desired for less than the depreciation alone on your auto costs. Gas, by the way, is the ninth item of expense in operation of an auto. Think this over.

Visitors say "Your Biddeford & Saco company has a set of men as polite and courteous as can be found anywhere. This is a real community compliment.

The exhibit by the railway is only a part of a series of displays, which will run into March of next year.

To Safeguard Jacksonville's Little Ones

Operators of the Jacksonville Traction Company, Jacksonville, Fla., have received special instructions from the management in the matter of taking extra precaution for the avoidance of accidents in which children would be the victims. Children who are compelled to use the streets going to and from school are to receive the special consideration of all car operators.



A close-up of the South Shore working model

Working Model of South Shore Line Attracts 50,000

So detailed and so fascinating that it was easily the center of interest at each exhibit, a working model of the Chicago, South Shore & South Bend Railroad was recently shown for a week at the Greater Gary Exposition in Gary, Ind., and for a like period at the East Chicago-Indiana Harbor Exposition conducted jointly by those two Indiana cities. In the two weeks it was viewed by at least 50,000 persons.

The model was equipped with both passenger trains and freight trains built especially for the South Shore Line. It had high-speed turnouts and switches and an exact reproduction of the signal system of the railroad, being actuated by a set of ten standard relays. To give an impressive demonstration of the operation of the road the trains were run over 65 ft. of track and through switches. The tracks were laid on wooden ties, spiked with tacks and ballasted with crushed stone.

Power was supplied to the trains through an especially constructed catenary overhead system suspended from structural bridges similar to those used on the road's right-of-way. Built in the shape of an oval with banked curves, the tracks allowed fast operation. Pantographs were built on the motor cars to collect the power for the trains. Lights in the interior of the cars added to the reality.

Track circuits of electricity operated the signals which flashed alternate green, yellow and red warnings as the trains sped around the oval. As one train passed a certain point the signals changed automatically and thus gave warning to the following train.

This interesting and instructive exhibit will soon be shown in other cities served by the South Shore Line. It was built and set up by Earl Stover of the electrical engineering department.

Rehabilitation Does Pay

Stockholders and friends of the Cincinnati, Hamilton & Dayton Railway have been handed a reprint of a series of editorials and articles from ELECTRIC RAILWAY JOURNAL commenting upon and describing the significance of the physical and financial rehabilitation of the road.

These editorials and articles were written at or about the time the Cincinnati, Hamilton & Dayton put into service its new equipment, but subsequent experience has served only to emphasize the conclusion therein expressed that fine equipment operated over a rehabilitated, modernized property would stimulate a popular response which would be most gratifying. It is the conviction of President Conway that the company's experience emphatically demonstrates that the public will patronize a high-class, modern interurban railroad in preference to other methods of transportation.



Not much was left out of the exhibit showing the South Shore company's activities

Omaha Franchise Draft Rejected

Formal rejection has been made to the City Council of Omaha, Neb., of the proposed new franchise for the Omaha & Council Bluffs Street Railway. Six reasons are assigned for the refusal. The company points out that the franchise binds the company for 30 years to observe the provisions of the contract, while the city may amend it any time that it chooses. This creates a condition where the company is left without credit or security. It is shown that the grant would make inoperative any service orders of the State Railway Commission unless the Council approved. It is objected that the measure provides that the company shall be subject to limitations and burdens that may later be imposed by law without allowing it any of the benefits that future laws may give.

It is argued that the ordinance is unduly restrictive in that the company will be forced to ask the Council for permission to do many things purely managerial in character. Lastly, it is objected that under one section, if the bondholders thereafter should bring action to establish any pre-existing rights and the court should sustain such claim, the measure would immediately become void.

Increased Fare Talk in Dallas

The City Commission of Dallas, Tex., will oppose any effort on the part of the Dallas Railway & Terminal Company to increase fares. This was made known when events seemed to point to the possibility of action along these lines by the railway. The present 7-cent cash fare with five tokens for 30 cents was put in effect more than a year ago when what is known as Everman Plan No. 4 was approved. Everman Plan No. 4 called for certain improvements, extensions and betterments to be completed within a specified time in return for which the railway was authorized to put these fares into effect. The company has now been told that the city will not consider any proposal for any change in fares until Everman Plan No. 4 has been complied with in every detail. It will be January, 1928, before the company has completed these improvements.

New Fare Schedule in Muskogee

The State Corporation Commission of Oklahoma has granted the following new schedule of fares to the Muskogee Electric Traction Company, applying to city lines in Muskogee and interurban lines of the company: City cash fare 10 cents, three tickets for 25 cents; school children between six and fifteen years old between points in the city and to each of the two zones on the Hyde Park line and within each of the five zones on the Fort Gibson line 4 cents, providing that no less than 25 tickets be purchased at one time by each child; for continuous passage from points in the city to Hyde Park 20 cents and the same for return trip; cash fare of 10 cents within each of the two zones on the Hyde Park line with right to sell tickets for continuous passage between Muskogee and Hyde Park at 15 cents each, providing that no less than twenty tickets are purchased by each person at one time; from Muskogee to Fort Gibson 40 cents cash fare or 10 cents for each of the five zones on the line; for tickets between Muskogee and Riverside at end of the second zone on the line 15 cents each when not less than twenty tickets are purchased at one time.

Kings of Swat in New Surroundings

Baseball's most distinguished ambassadors, "Busting Babe" and "Larruping Lou," or Babe Ruth and Lou Gehrig of the New York Yankees, disported themselves recently on the front of a Milwaukee locomotive. The occasion was



Busting Babe and Larruping Lou in new rôles

during a visit of the New York Yankees, new world champions of the baseball realm, to St. Paul for an exhibition game the latter part of the season. It so happened at the time that one of the giant Baldwin-Westinghouse electric locomotives used by the Chicago, St. Paul & Milwaukee Railway was on exhibition there in connection with the new roller bearing transcontinental limited of the Milwaukee road, then making a tour from Chicago to the coast. Among the visitors to the exhibition were "Busting Babe" and "Larruping Lou," and the camera caught these two stellar performers amid new surroundings.

Seven-Cent Fare in Michigan City

The Indiana Public Service Commission has authorized an increase from 5 to 7 cents in fares at Michigan City on petition of the Chicago, South Bend & Northern Indiana Railway, effective Nov. 15.

Municipal Railway Bond Issue Defeated in San Francisco

Once again the $4,600,000 Municipal Railway bond issue has failed to carry in San Francisco. Defeated last June, it was referred to the voters again on Nov. 8 and again it failed of the necessary votes. The vote was, for the bonds, 66,322; against the bonds, 46,871, or 8,807 votes short of the required two-thirds.

Opponents of the measure reiterated the arguments they advanced when the proposal was submitted in June. Some of the extensions proposed are unnecessary, it was claimed. Included in the bond issue was a proposal to buy fifteen new cars and to extend eight lines, including one bus line.

The railway bond measure, however, was more popular than a proposal for a $2,000,000 municipally owned Hetch Hetchy transmission power line. This measure failed by 16,413 votes of the necessary two-thirds.

Proponents of municipal ownership, however, are claiming a victory for these principles, pointing to the fact that a proposal to build a publicly owned bay bridge carried by 2,467 majority and a counter proposal to construct a privately owned bridge was defeated by nearly 9,000 votes.

Mayor James Rolph, Jr., was elected for the fifth successive term, by 30,936 votes, the largest majority he has ever received. He campaigned for the boulevard bonds, which measure carried, but he was silent on the railway bond issue. The vote was the heaviest ever cast at a San Francisco municipal election.

Eight-Cent Cash Fare in Tulsa

Fares are to be increased at once by the Tulsa Street Railway, Tulsa, Okla., under an order issued on Oct. 28 by the Corporation Commission. Following a hearing, F. E. Kennamer, judge of the United States court, Northern District, on Oct. 25 instructed the receiver to apply to the Corporation Commission for an increase in fares to the following schedule: Cash fare, 8 cents; two adult tickets 15 cents; children under twelve years 3 cents cash fare; school children's tickets 2½ cents. This schedule has been aproved by the Corporation Commission.

The schedule heretofore in effect has been 7 cents cash fare and four tickets for 25 cents; the fares applying to children were unchanged by the commission's ruling. The receiver in his application gave a comparative statement of revenues and expenditures of the company, which showed that expenditures, including operating expenses, taxes and bond interest, had exceeded operating revenues as follows: 1924, $44,225; 1925, $63,029; 1926, $62,682, and for the first nine months of 1927, $33,064.

The company has been in receivership since Oct. 19, 1925.

The present fare increase is the first since Jan. 10, 1921.

Recent Bus Developments

For the Good of the Majority

City manager of Cincinnati lays down some transportation essentials for benefit of private car operators

THAT streets should be used under a plan best serving the people as a whole was the view held by Col. C. O. Sherrill, city manager of Cincinnati, Ohio, in his answer to a protest filed with the city against the proposed use by the Cincinnati Street Railway motor coaches of a recently completed section of Central Parkway.

The railway had applied for permission to use this boulevard for its Westwood motor coach route on the ground that by running over this street the line would have a more direct route to the business section.

Citizens Have Equal Rights

A citizen sent a letter to the City Council asking that this privilege be refused. No action has been taken, but Colonel Sherrill in his answer to this protest discussed the prior rights of mass transportation when considered in connection with the rights of the driver of a private car. He said in part:

Every citizen in the bus has an equal right with every other citizen to purchase and drive his own automobile for his own personal convenience, if he so desires. The average number of persons per private automobile is less than two. It thus takes 500 automobiles to carry 1,000 persons. These automobiles are capable of carrying more persons and if something could be done to collect the 1,000 persons in 250 machines, the congestion would be materially reduced in proportion to the citizens served.

Public transportation offers a means of assembling a larger number of persons into one vehicle. There can be no question but that if buses and street cars were stopped today the vehicular congestion on the streets would be enormous tomorrow. One of the surest means of reducing congestion is so to improve collective and public transportation that for ordinary business trips to and from the congested area persons will leave their automobiles at home and ride the public conveyances. It is a misconception to feel that buses add to the congestion, and such misconception is based upon a viewpoint of individual desires, and not upon a viewpoint of the problem of transporting thousands of citizens.

It is doubtful if buses are a controlling factor in the rate at which traffic moves on our wider streets. But even here the problem is not the speed in miles per hour which an individual car may or may not be able to make for the convenience of some individual person, but the real measure of the rate of traffic movement is the length of time that it takes to move a thousand persons in or out of the city.

In the morning and evening rush hours there are thousands of citizens desiring transportation, and that method which can transport these citizens (all with equal rights) to their destination in the least time is better service to the city as a whole than is that method which might possibly allow one individual, concerned with running his own private car, to gain a minute or two of time.

In analyzing a problem of this kind it is important to look inside of the bus and see and recognize that it is carrying citizens, each one of whom has a right to consideration in the problems with which the city is confronted, and each one of whom has an equal right to have the vehicle on which he is riding occupy at least the same space and time that is occupied by a vehicle in which a single citizen is riding, even though that single citizen may own the vehicle. In the interests of the development of Cincinnati all streets should be used under those regulations which will best serve the people as a whole.

I am not at all convinced, as yet, that there is any benefit to citizens in buses using Central Parkway. But if it can be shown that those citizens can be better served by such a routing, then certainly they are entitled to consideration; and if it can further be shown that the very best possible transportation will persuade people to utilize collective agencies of transportation, then we have not only reduced congestion, but we have increased the capacity of the street and have increased the rate at which traffic, measured in thousands of persons per hour, can be handled.

Bronx Buses Begin Business

Legal bus operation under a franchise granted by the Board of Estimate of New York City and a certificate of convenience and necessity granted by the Transit Commission was begun in the Bronx on Nov. 1 by the Surface Transportation Corporation, a subsidiary of the Third Avenue Railway. Operation of six Bronx routes with a type of bus approved by the Board of Transportation was authorized on Oct. 31 by the passage of a resolution by the Board of Estimate. The effect of the resolution was to give an experimental period of 120 days for the use of a particular type of bus. Except for a few comparatively unimportant bus lines, mostly on the outskirts of the city, and the routes operated by the Fifth Avenue Coach Company, this is the first legalized bus operation for half a dozen years, the so-called emergency lines supervised by the Department of Plant and Structures being without legal warrant.

Bus Lines Not Warranted in California by Revenues Derived

The Key System Transit Company, Oakland, Cal., has applied to the California Railroad Commission for authority to abandon bus service between a terminus at Santa Clara Avenue and High Street in Alameda and a terminus at Ygnacio Avenue and High Street in Oakland, as not being warranted by the revenues derived. It is stated that the total revenue from this line from July 10, 1924, to June 1, 1927, was $6,958 and that the cost of operation was in excess of $41,000.

Taxis in Atlantic City Go to Mitten Management

Mitten Management, Inc., has taken over the operation of the Yellow Cab Company, Atlantic City, operating 118 cabs. Ownership of the Atlantic City company is vested in the People's Rapid Transit Company, intercity bus operator of Mitten Tours, a subsidiary of the Philadelphia Rapid Transit Company.

J. T. Smith, former assistant general manager of the Yellow Car Company, Philadelphia, is the newly appointed Yellow Cab manager in Atlantic City.

Selling Service in New Jersey

More than mere operators are the Public Service men who run the trolleys and buses. They are salesmen in a "highly competitive business" requiring for its success "the finest kind of selling ability." And, to get across their product, in competition with 500,000 automobiles, they must drive safely, be courteous, maintain schedules and give proper attention to passengers' convenience.

This is the thought in the latest executive bulletin, No. 64, issued on Nov. 1 by Matthew R. Boylan, vice-president of the Public Service Railway and the Transportation Companies to his salesmen-operators.

The operators are informed they must be on their toes every minute of their working time, because "good service is what sells local transportation."

"Every time you make a friend for your company you are selling transportation," Mr. Boylan tells them. "Every time you miss or run by a possible passenger, you neglect an opportunity to sell transportation."

Plea by Texas Line for Fare Increases

Application has been filed with the Texas Railroad Commission by the Texas Motor Coaches for permission to increase bus fares between Dallas and Fort Worth to 3¼ cents a mile. This would make the proposed fare $1.10, compared with 50 cents now charged. The fare by interurban between the cities is 90 cents.

In its application the coach carrier represents that lines are being run at a loss under the fare of 50 cents, put in effect during a rate war among the several companies. It is further represented that experience has shown that service cannot be given on bus lines in Texas with a fare less than 3¼ cents a mile. The case will be heard on Nov. 12.

The Texas Motor Coaches is the company recently organized under sponsorship of the Northern Texas Traction Company to control the operation of bus lines between these two cities purchased by the Stone & Webster interests.

Financial *and* Corporate

Final Transfer of St. Louis Property Ahead

Arrangements were made recently to pay approximately $890,000 into the treasury of the St. Louis Public Service Company by Nov. 8 as the final installment on the common stock of the company. Within another 30 days the transfer of the properties of the United Railways to the new company will probably be made by Receiver Rolla Wells. When the final payment is made on its common stock the company will have received $3,076,812 from that source. This stock went to holders of United Railways preferred stock who exercised their option to purchase common stock in the new company under the reorganization plan. The new company will obtain $4,295,562 through the sale of common stock.

The St. Louis Public Service Company purchased the railway properties at foreclosure sale several weeks ago. The purchase has since been approved by the Missouri Public Service Commission.

Several important matters must be settled before the final transfer of the properties takes place. These include the election of permanent officers for the new company and the determination of its fixed policies. It is generally believed that Sam W. Greenland will be made operative executive for the new company. He has been identified with the work of the reorganization committee for several years and formerly was connected with the Indiana Service Corporation at Fort Wayne.

Indianapolis Decision Still Under Fire

The established rule of the Indiana Public Service Commission, which in the past has been that the statutes of the state do not permit one utility to issue securities for the purpose of buying stock in another, apparently will have to be violated when the commission completes the order by which it was instructed in the Circuit Court to approve the $500,000 note issue for the Indianapolis Street Railway to use in the purchase of capital stock of the Peoples Motor Coach Company.

Late in 1926 Arthur L. Gilliom, Attorney-General of Indiana, pointed out that there were only two ways by which change of ownership of going public utilities could be accomplished. One of these, he said, was under the statute which authorized consolidations and mergers with approval of the commission, provided the combined capital stock of the companies merged was not of greater proportion than the stock of the individual companies. The other method, he said, was for one utility to buy outright the used and useful property or business of another concern.

Mr. Gilliom took the position that the commission did not have legal authority to approve such transactions. On the other hand the commissioners said they must obey the court's order under fear of being in contempt of court.

In its ruling the commission held that the financing plan under which the railway proposed to issue $500,000 of 8 per cent notes for the purchase of capital stock in the bus company was unsound because of the high interest rate and expressed the opinion that the bus enterprise would suffer if it came under control of the railway.

The law under which it is possible to appeal from the commissioner's finding has been held unconstitutional by the Attorney-General but no party adverse to the revised method of procedure appeared in the appeal hearing to raise such a question.

Sale of Boston & Worcester Road Under Foreclosure Approved

Judge Sanderson of the Massachusetts Supreme Court has affirmed the sale of the Boston & Worcester Street Railway to Henry S. Rising, on the terms previously reported in the ELECTRIC RAILWAY JOURNAL. The Massachusetts Department of Public Utilities has authorized Mr. Rising and fifteen associates to organize and finance the new corporation which will operate this property under the name of Boston, Worcester & New York Street Railway. One reason for adopting a new name is that the inclusion of the name New York gives the company a wider business prospect, inducing a line of travel not suggested by the old name.

The Department of Public Utilities finds that a total capital of $3,034,000 does not exceed the cost of replacement of the property, or a fair value, and therefore approves a capital stock issue of $2,028,000. This is the amount of stock the new corporation asked for, with an understanding that it may issue bonds for $1,008,000.

16 Per Cent More Revenue from Higher Fares in Melbourne

Deficit in Australian City changed to surplus in year ended June 30, 1927. Operating ratio down to 70.92 per cent. Interesting comparable statement of earnings

THE Melbourne and Metropolitan Tramways Board has summarized its operations for the year ended June 30, 1927. The capital cost of the undertaking at June 30, 1927, was as follows:

Cable tramways	£1,865,462
Electric tramways	5,029,139
Motor omnibuses	119,472
	£7,014,073

During the year the board's expenditure upon the construction and reconstruction of tramways, conversion of cable tramways to electric traction, erection of buildings, construction of rolling stock, purchase of lands, and substation equipment, etc., amounted to £958,216.

Receipts from passenger fares totaled £2,487,573, compared with £2,142,234 for the preceding year, an increase of £345,339, or 16 per cent. This increase is due mainly to the revision of fares which took place on May 1, 1926, and to the additional revenue earned upon new tramway extensions and from the conversion of the Toorak and Chapel Street tramways to electric operation.

It is estimated that the revision of fares produced increased revenue to the extent of approximately £300,000 per annum.

The total operating expenses were £1,777,107, compared with £1,775,568 for the previous year, showing an increase of £1,539. The average total operating

CONDENSED STATEMENT OF INCOME AT MELBOURNE

Year to June 30, 1926			Year to June 30, 1927
£2,142,234	Traffic revenue		£2,487,573
10,694	Advertisements, rents, etc.		18,282
£2,152,928	Total revenue		£2,505,855
1,775,568	Less operating expenses		1,777,107
£ 377,360	Gross surplus		728,748
248,921	Less interest and other charges		299,359
£ 128,439	Available for appropriation		£429,389
	APPROPRIATIONS		
£104,393	Payments to State consolidated revenue	£108,453	
42,674	Transfer to loan redemption accounts	49,809	
3,699	Transfers to loan sinking funds	4,199	
	Transfer to renewals reserve fund	158,000	
218,650	Transfer to general reserve fund	100,000	
1,500	Transfer to fire insurance reserve	7,000	
370,916			427,461
£ 242,477	Deficit—Transferred from general reserve fund.	Surplus	£1,928

MILEAGE OF TRAMWAY AT MELBOURNE

	Route-miles
Cable	33.675
Electric	102.142
	135.817
(Single-track, miles 256.848)	

Traffic Receipts:		
Cable	£1,004,794	
Electric	1,419,376	
Bus	63,403	£2,487,573

Traffic Receipts per Car-Mile	d.	Cents
Cable	24.56	(49.1)
Electric	25.45	(50.9)
Bus	14.78	(29.6)

Mileage Run:		
Cable	9,817,468	
Electric	13,387,869	
Bus	1,029,796	24,235,133

Average Speed Per Hour Including Stops:	
Cable	9.41 miles
Electric	11.09 miles
Bus	9.91 miles

Passengers Carried:		
Cable	99,978,416	
Electric	118,858,967	
Bus	5,374,484	224,211,867

Number of Tramcars:	
Cable dummies	407
Cable trailers	387
Electric cars	438
Number of employes	5,955

expenses per vehicle-mile, including power cost, was 17.599 d. (35.2 cents) as against 17.392 d. (34.8 cents) for the previous year, while the proportion of operating expenses to total revenue is 70.92 per cent as against 82.47 per cent last year.

Deducting the total operating expenses from the income a gross profit of £728,748 is shown, made up as follows:

Cable tramways	£310,197
Electric tramways	465,457
	775,654
Less operating loss on buses	46,906
Gross profit on operation	£728,748

The statement on page 920 shows in condensed form the income and expenditure and the appropriation of the gross surplus on operation for the year under review compared with that of the previous year.

Since the inception of the board a total of £744,310 has thus been paid to the state government consolidated revenue. This sum, applied as it has been to non-tramway purposes, more than counterbalances the total deficit of previous years, amounting to £600,187.

The board's total indebtedness in respect of loans June 30, 1927, was	£4,677,939
Deduct loan sinking funds invested in government securities	68,802
	£4,609,137

The reserve funds were as under:	
Renewals reserve account	£ 57,104
General reserve account	100,262
Public risk reserve account	20,852
Fire insurance reserve account	39,270
Loan redemption accounts	200,160
Guarantee fund	7,783
	£ 425,431

With the exception of the guarantee fund, all the above reserves are invested in the board's undertaking.

The payments to the consolidated revenue of the State of Victoria under Section 88 of the act in respect of the Metropolitan Fire Brigades Board, Queen's Memorial Infectious Diseases Hospital and the Publicans' Licensing Equivalent were the highest since the inception of the board, totaling £108,453, as compared with the sum of £70,000, the estimated annual contribution at the time of the passing of the board's principal act.

The 224,211,867 passengers carried last year compared with 234,064,148 for the previous year, an apparent decrease of 4.2 per cent. This decrease is, however, due in part to the loss of one-zone riders and partly to the increase of through services following cable electrification, whereby counting the same rider twice has been eliminated.

Commission Allows B.-M.T. Issue

To enable the company to pay for new cars and other equipment, the Transit Commission has authorized an issue by the New York Rapid Transit Corporation, affiliated with the Brooklyn-Manhattan Transit Corporation, of a bond issue of $17,000,000 to be sold at not less than 94. The bonds will be issued under the New York Rapid Transit Corporation's refunding mortgage and will be known as refunding mortgage 6 per cent sinking fund bonds, series B, to be dated July 1, 1927, and to mature July 1, 1968. The bonds are to be redeemable in whole or in part on any interest payment date at 105.

Better Report by Schenectady Property

The net corporate loss of the Schenectady Railway, Schenectady, N. Y., for the quarter ended Sept. 30 was cut down nearly $100,000 when compared with the corresponding quarter of 1926, according to the report filed with the Public Service Commission. A decrease of $23,000 in operating revenue was more than offset by a decrease of $126,000 in operating expenses.

The comparative figures of earnings of the company for the third quarter of the two years follow:

	1926	1927
Operating revenues	$407,326	$384,296
Operating expenses	456,484	330,206
	$49,159*	$54,090
Net corporate loss after deducting taxes assignable to railway operations, fixed charges, etc.	$131,120	$ 36,686

*Loss.

Decline in Traffic in Baltimore

For the first eight months of 1927 the United Railways & Electric Company, Baltimore, Md., carried 145,256,760 passengers, against 148,870,529 passengers for a similar period of 1926. During the first six months 111,351,246 passengers were carried, against 113,715,254 for the first six months of the year previous.

$2,000,000 Omaha Bond Issue Offered

Ames, Emerich & Company, Inc., Chicago and New York, offered for subscription on Nov. 7 $2,000,000 of Omaha & Council Bluffs Railway & Bridge Company first mortgage 6 per cent sinking fund gold bonds due Oct. 1, 1947. The offering price was 100 and accrued interest to yield 6 per cent.

The bonds are secured, as just indicated, by a first closed mortgage on all the fixed properties of the bridge company, valued in recent appraisals at a net sound value of $5,482,477. The present bond issue in effect represents a 75 per cent loan against the bridge alone and a 37 per cent loan against the value of the bridge and the railway system. The bankers pointed out that the attractiveness of the issue was further enhanced by provisions of a sinking fund which will operate to retire more than half the issue before maturity.

The Omaha & Council Bluffs Railway & Bridge Company owns a toll bridge across the Missouri River, linking Omaha and Council Bluffs. This is the only bridge between the two centers of population, and across it flows a steady stream of pedestrians, vehicular and rail traffic. Forming an indispensable medium of communication and connection, the bridge has become a permanent factor in the economic life of the two cities.

Average annual net earnings of the bridge property from toll receipts, after depreciation, for the last five years were $327,845, as compared with annual interest requirements on this issue of $120,000. Net earnings in 1926 were equal to more than 3.19 times annual interest requirements. For the first eight months of 1927 net earnings showed a substantial increase over the similar period last year and were at the rate of 3.52 times interest charges.

In approving the Omaha issue the Nebraska State Railway Commission branded as subversive of all government the plea of Senator Howell that it write its own valuation basis "until the courts come in agreement." Mr. Howell led the city into public ownership of gas and water plants and he is now seeking to force the railway to sell the bridge to the city at a low figure as part of the price of a new railway franchise. He urged that the original cost of the bridge, which he placed at $1,500,000, be held as its present fair value.

The commission says it is not concerned with the future ownership of the bridge; that the company had presented the finding of a federal court master in chancery that it owns $4,800,000 of property; that reliable engineers testified that its present fair value is $2,673,000, and having demonstrated that a proper relationship exists between stocks and bonds, the commission will authorize the issue. The bonds are to replace an outstanding issue of 5 per cent bonds. The price set by the commission was not less than 93½ per cent of par.

Receiver Authorized to Issue Securities

Robert W. Perkins, receiver of the Shore Line Electric Railway, New London, Conn., has been ordered by the court to sell $50,000 of the Groton & Stonington Traction Company 6 per cent twenty-year income gold bonds and 997 shares of stock of the company at a specified price that will yield 80 per cent of the face value of the bonds and stock.

Decision Against Chicago Railways Certificate Holders

Efforts of participation-certificate holders to win a voice in the conduct of the affairs of the Chicago Railways, Chicago, Ill., by a petition filed in the federal court, seeking to intervene in the receivership proceedings, have been ruled out by Judge Wilkerson, sponsor for the properties under the receivership.

$600,000 Bond Issue Sought by Gary Railways

In a petition filed on Nov. 1 with the Indiana Public Service Commission at Indianapolis the Gary Railways requested authority to issue and sell $600,000 of 6½ per cent mortgage bonds at not less than 92 per cent of par. Receipts from the sale of this issue, the petition states, are to be used to reimburse the company's treasury for money expended for additions and betterments completed since Nov. 1, 1925.

Scrapping of Maryland Line Under Way

The work of scrapping the Cumberland & Westernport Electric Railway, Cumberland, Md., built in 1901, extending through the Georges Creek mining valley from Cumberland to Westernport, 30 miles, has begun. The S. Snyder Corporation, Rochester, N. Y., has contracted with the Cumberland & Westernport Transit Company for the removal of all railroad ties, trolley wires and poles and the dismantling of the power house at Clarysville.

Increase in Revenue Passengers in Winnipeg

During the eight months of 1927 the Winnipeg Electric Company, Winnipeg, Canada, carried 2,251,818 more revenue passengers than in the corrresponding eight months period in 1926, showing an increase of 6.1 per cent. In reporting on the past quarter President McLimont said that this improvement could be attributed to various factors, among which were the increased industrial activity, providing more employment and consequently more railway patrons, and the steady flow of immigrants and tourists going to Winnipeg and the West.

Book Reviews

America Comes of Age

By André Siegfried. New York, N. Y.: Harcourt, Brace & Company. 358 pages. Price, $3.

No more romantic rôle is being played in America today than that of laborer and no more interesting tale of his character and viewpoint than that told by André Siegfried, a frank and fearless Frenchman, who sees this country now at maturity. Willing to use machinery, the American workman has a different conception when the situation calls for the use of his hands. He looks for quick results and quicker returns. In such respects does he differ from the European worker who prides himself on the skill and patience which effect perfection in the smallest and most inconspicuous products. To understand American workmen and the present living standards in the United States one must go back and see the prologue to this great American drama.

Through a continental's unbiased and unemotional eyes we learn something of the efforts at amalgamating 100,000,000 people in these United States, their origins and religions and their ultimate assimilation in the great melting pot. The youth and pioneering days of America are over; she has entered upon maturity. This writer asks what of her economic status, her political imbroglios, her international relationships, her individual standing; what of her negro problem and the yellow peril; what is she contributing to civilization and what of her future? Herein is revealed a comprehensive and intimate study of all classes, creeds and color which make up America—a survey which required a review of its psychological, economic and political problems.

In discussing the spirit and methods of American industry, the writer mentions as important points our home market of 120,000,000 people, making this the most protectionist country in the world, and to our area of 3,000,000 square miles, constituting the largest entirely free market in the world. Mass production is the logical result. In our organization and standardization of industry he sees subtle influences at work—scientific advertising, the doctrine of "service," efficiency, waste elimination in the smallest details of manufacturing. In the latter detail he refers to the significant efforts of the Department of Commerce to reduce the number of different types produced by each industry and to concentrate on a limited number of standard sizes and shapes in the desire to terminate the chaotic condition that has existed. Investigations showed that there were 66 shapes of bricks which could be reduced to seven; 175 kinds of automobile wheels which could be reduced to four, and 287 kinds of tires reducible to 32. Such simplifications were immediately adopted.

But Mr. Siegfried, the author, has done more than expatiate on the problems facing this country now that her days of philandering are over. Gently he chides us on our goal—merely successful careers with little heed for the "relaxation of meditation and culture." Of course he sees wonderful strides made in materialistic fields, but he also sees retrogression and sacrifice from the point of view of individual refinement and art. "Even the humblest European sees in art an aristocratic symbol of his own personality, and modern America has no national art and does not even feel the need of one."

Whether or not one agrees with Mr. Siegfried, he can admit the author's straightforwardness and see something provocative in the question he puts in the form of a declaration, "So the discussion broadens until it becomes a dialogue, as it were, between Ford and Ghandi."

Electrical Directory of Australia and New Zealand, 1927 Edition

Tait Publishing Company, Pty., Ltd., Melbourne, Sydney. 264 pages. Price 7s. 6d. and oversea postage 1s.

Valuable statistics on the tramway operations in Melbourne, Sydney and Kalgoorlie, Australia, and in Auckland. Christchurch and New Plymouth, New Zealand, are included in the seventh edition of this electrical handbook. For reference work it serves as a complete and comprehensive document on electric lighting and tramway undertakings in that part of the world. A new feature of this issue, which is larger than its predecessor, is in the shape of maps showing certain supply areas.

New England Economic Situation

Comparison of conditions in New England with other sections of the nation. School of Business Administration, Harvard University, Chicago: A. W. Shaw Company. 260 pages.

Nine papers prepared by the undergraduate students of economics in the School of Business Administration, Harvard University, are contained in this book. These studies discuss wealth, capital invested in railroad developments, influence of legislative regulation upon the relative growth of national banks, state banks and trust companies; wage earner and his saving deposits; the future of the automobile industry, and four New England industries—cotton, woolen and worsted, boots and shoes, and hosiery and knit goods. The financial, banking and industrial aspects of New England are therefore covered in much detail. The studies include a historical background and provide material for comparison with conditions in the rest of the country.

Personal Items

E. J. Anderson Heads Iowa Operators

E. J. Anderson, general superintendent of the Tri-City Railway, Davenport, Iowa, was elected chairman of the operators' section of the Iowa Electric Railway Association at the recent meeting of that body in Davenport. He is in charge of the company's line in both Illinois and Iowa.

Mr. Anderson has been connected with the company at Davenport more than twenty years. He entered the service there as a conductor. To Mr. Anderson other fields did not look greener than his own. He was content to wait and work. His value to his company did not long go unrecognized, and soon after he entered the service of the company there began for him a series of promotions through various intervening ranks until his elevation some time ago to the post he now occupies.



E. J. Anderson

His company has been one of the type hardest hit under the changed economic conditions since the war, but Mr. Anderson has never faltered in his fealty to the industry of which he is a part or in his faith in the company by which he has been employed. The high esteem in which this operator who has risen from the ranks to an executive post is held by his associates in the industry of which he is a part is attested by their election of him to the post of greatest honor it is within their power to confer.

William Finn Promoted in St. Louis

William Finn, roadmaster of the city lines of the United Railways, St. Louis, Mo., has been promoted to a higher position, with additional authority, and has assumed the newly created title of superintendent of roadway. This honor came to Mr. Finn on the 25th anniversary of his appointment as roadmaster and after a record of 42 years of service. Although a commercial career was planned for him, he soon got enamored of transportation and became connected with the Old Missouri Railroad in St. Louis. This company now is one of the units of the United Railways. After the cable system began operations in St. Louis, Mr. Finn for eleven years was active in the position of track foreman, in which he handled important construction projects. When all the competing systems in the city were consolidated, Mr. Finn was taken over in the big merger.

New Quarters for B.-M. T. Mechanical Department —Staff Changes

The office force for the mechanical department of the Brooklyn-Manhattan Transit Corporation, headed by William G. Gove, superintendent of equipment, moved into its new office structure last week. This is one of the large group of buildings which constitute the Coney Island repair shops. The enlarged organization required for carrying on the work at the new shops made necessary several new appointments and duties of other heads of departments were changed in some cases. On Nov. 4 Mr. Gove announced the following appointments and reappointments:

RAPID TRANSIT DIVISION

Repair Shops

Coney Island general repair—T. F. Delaney, superintendent; D. D. Owens, general foreman; S. Vrendenburg, general foreman.

Coney Island electrical repair—E. C. Parham, general foreman.

East New York and 36th Street shops—P. J. Kenny, general foreman.

Thirty-ninth Street (elevated)—J. F. Doherty, general foreman.

Inspection Shops

Coney Island office of superintendent of rapid transit—I. M. Burns, superintendent.

Coney Island inspection (subway)—J. G. McIntyre, general foreman; J. A. Grace, assistant general foreman; J. Connolly, night foreman.

East New York (subway and elevated)—C. I. Ekerman, general foreman; J. C. Heiberg, assistant general foreman; P. J. King, night foreman.

Montrose Avenue (subway)—L. E. Pfeifer, foreman.

36th Street (elevated)—M. J. Costigan, foreman; A. Reventlow, night foreman.

Queens Plaza (elevated)—G. J. Beirlein, foreman.

SURFACE DIVISION

Superintendent of surface line shops—Niles Persons.

Repair Shop

DeKalb—E. R. Pike, superintendent.

Inspection Shops

Superintendent—George Siebert.

Bergen Street—J. F. Schultz, foreman; A. J. Fisher, night foreman.

Canarsie—J. C. Weir, foreman; E. G. Weingarten, night foreman.

DeKalb—J. Krieger, foreman; J. H. Hayman, night foreman.

East New York—W. F. White, foreman; E. Wetzel, night foreman.

Ninth Avenue—J. E. Myers, foreman; J. Hanbury, night foreman.

Twenty-third Street—M. F. Hutt, foreman; A. Scott, night foreman.

Twenty-fourth Street garage shop—C. L. Knight, foreman; W. L. Swezey, night foreman.

Supervising inspector—P. S. Scott.

OBITUARY

George Stanton

George Stanton, widely and favorably known among the officials and engineers of both steam and electric railroads throughout the country, died on Oct. 20 in Cleveland, Ohio.

Mr. Stanton's association with railroad men began about 40 years ago, when he was with the Grand Rapids & Indiana Railway. He left this company after some years of service with it to go into sales work, which line he followed for more than 35 years. He was connected with the U. S. Wind Engine Company, Batavia, for a long time and next was with the Q. & C. Company, Chicago, for nearly ten years. Early in 1904 he went with the Cleveland Frog & Crossing Company as manager of sales, and was still serving in that capacity when he died.



George Stanton

JASON C. CAMERON, connected at one time in an official capacity with the Brooklyn City Railroad, died at Rutherford, N. J., recently. After seeing service in the Civil War he became associated in Brooklyn transit management, which occupied his attention for 30 years. He assisted in supervising the work involved in the change from horse cars to electric power and had charge of the company forces during the strike of 1896. Mr. Cameron later became general manager of the White Line Railway Company, operating in Hoboken. He retired in 1910. He was born in Vermont 85 years ago.

Manufactures *and the* Markets

New $50,000 Station for Busy Division Point in Chicago

Construction work on a new $50,000 elevated station on the south side division at 63d and Halsted Streets, it is reported, has been launched by the Chicago Rapid Transit Company, Chicago, Ill. The old structure at this point, one of the busiest on the system, it is understood was not adequate.

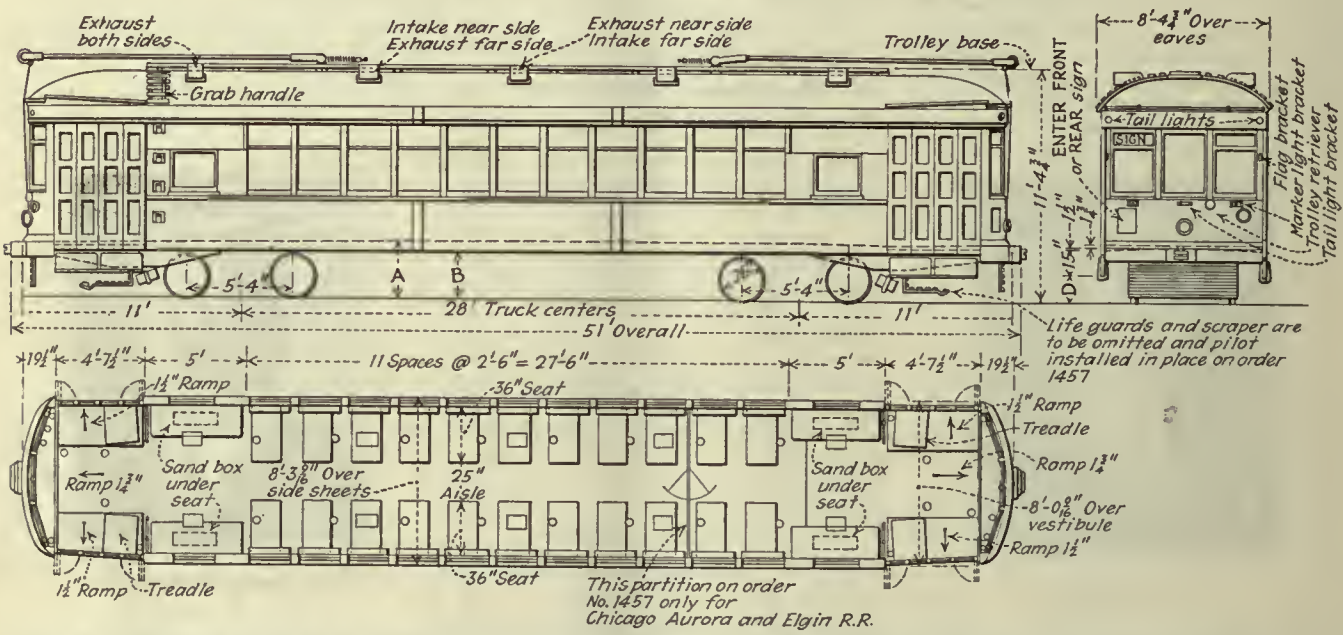
Similar in design to the new standard type of station buildings of the Rapid Transit Lines the new structure will contain many improved facilities and when completed about Dec. 1 it will be one of the finest of the new buildings erected by the "L" lines in recent years. Two entrances, one on Halsted Street and the other on 63d Street, will furnish added accessibility to patrons.

The exterior of the building is pleasingly designed in white terra cotta with old English mission style brick panels.

Two Freight Engines and Four Cabooses for South Shore Line

Two additional 80-ton locomotives for main line freight service were ordered Sept. 26 by the Chicago, South Shore & South Bend Railroad. The new locomotives, which will closely duplicate the first four to be placed in service on the South Shore Line more than a year ago, will be built by the Baldwin Locomotive Works and equipped by the Westing-

North Shore Line and C., A. & E. Car Order Nearing Completion



Typical seating plan and elevation (with the exception of smoking compartment) of the nine cars ordered by the Chicago, North Shore & Milwaukee Railroad for Milwaukee city service, and one unit ordered by the Chicago, Aurora & Elgin Railroad to be used in interurban shuttle service between Batavia Junction and Batavia

Work on the ten one-man, two-man, double-end cars ordered by the Chicago, North Shore & Milwaukee Railroad, Chicago, Ill., specifications for which were published in the JOURNAL for July 16, was rapidly nearing completion in October. The order was placed with the St. Louis Car Company, St. Louis, Mo. Recent advices were to the effect that nine of the units would be placed in city service in Milwaukee, Wis., and that the other unit of interurban type was ordered by the Chicago, Aurora & Elgin Railroad, Aurora, Ill., and will be used in shuttle service between Batavia Junction and Batavia. This unit varies in specifications from the other nine cars as follows: The interior trim is of dark brown walnut, motor equipment is 40 hp. instead of 35, and there has been provided a 20-ft. smoking compartment. The accompanying plan is typical of the ten units with the exception of the partition which divides the smoking section. Each unit will have an over-all length of 51 ft. As previously announced, two cars will have Timken roller bearings.

In its issue of Oct. 15 the JOURNAL inadvertently published what was thought to be a duplication of this order.

Following are revised specifications covering the ten units with the exception noted above:

Name of railway	Chicago, North Shore & Milwaukee Railroad and Chicago, Aurora & Elgin Railroad
City and state	Chicago, Ill., and Aurora, Ill.
Number of units	Ten
Type of unit	Nine one-man, two-man, motor, passenger, city, double-end, double-truck, and one interurban type
Number of seats	56
Builder of car body	St. Louis Car Company
Date of order	Aug. 5
Date of delivery	Nov. 1
Weight, total, approximately	40,000 lb.
Bolster centers	28 ft. 0 in.
Length over all	51 ft. 0 in.
Length over body posts	37 ft. 6 in.
Truck wheelbase	5 ft. 4 in.
Width over all	8 ft. 4½ in.
Height, rail to trolley base	11 ft. 6½ in.
Window post spacing	32 in.
Body	Steel and wood
Roof	Arcb
Air Brakes	Westinghouse Traction Brake Company
Armature bearings	Plain
Axles	3½ x 6 in.
Car signal system	Faraday high voltage
Compressors	Westinghouse DH-16
Conduit	Metal
Control	General Electric K-35 with line breaker
Curtain fixtures	National Lock Washer Company
Curtain material	Pantasote
Destination signs	Hunter
Door mechanism	National Pneumatic
Doors	End, folding, with treadle control
Energy saving device	Economy meter
Fare boxes	Johnson Coin Box Company
Finish	Duco
Gears and pinions	General Electric, grade M spur
Glass	Plate
Hand brakes	North Shore
Hand straps	Rico
Heat insulating material	Cork
Heaters	Railway Utility Company
Headlights	Golden Glow SM-95
Headlining	Haskelite, cream
Interior trim	Nine light mahogany and one dark brown walnut
Journal bearings	Eight cars plain, two cars Timken roller
Journal boxes	St. Louis 3½ x 6 in.
Lamp fixtures	Adams & Westlake
Motors	Four General Electric, inside hung, No. 265-A, 35-hp., and No. 265-A, 40-hp.
Painting scheme	Orange and maroon
Registers	Tuttle & Bailey
Roof material	Canvas and wood
Safety car devices	National Pneumatic Company
Sash fixtures	O. M. Edwards
Seats	Hale-Kilburn No. 300
Seat spacing	32 in.
Seating material	L. C. Chase, grade C mohair plush
Side bearings	Stucki
Slack adjusters	Turnbuckle
Steps	Folding
Trolley catchers	Knutson No. 5
Trolley base	U. S. 20-C
Trolley wheels	More-Jones
Trucks	St. Louis Car Co. EIB-64
Ventilators	Railway Utility Company
Wheels, type	Rolled steel, 26 in.
Wheelguards	H-B life guards

house Electric & Manufacturing Company. They will have a capacity of 1,280 hp. and cost about $56,000 each.

With the delivery of the new locomotives, about March 1 of next year, the freight motive power equipment of the South Shore Line will be increased to eight units. The last addition to engine equipment was made about six months ago, when two 53-ton Baldwin-Westinghouse locomotives were placed in switching service.

Commenting on the company's recent order, Charles H. Jones, general manager of the South Shore Line, said recently:

Maintenance of our fast schedule and overnight delivery service between Chicago and South Bend, coupled with the rapidly growing carload business from all parts of the United States, makes this addition to our motive power equipment imperative.

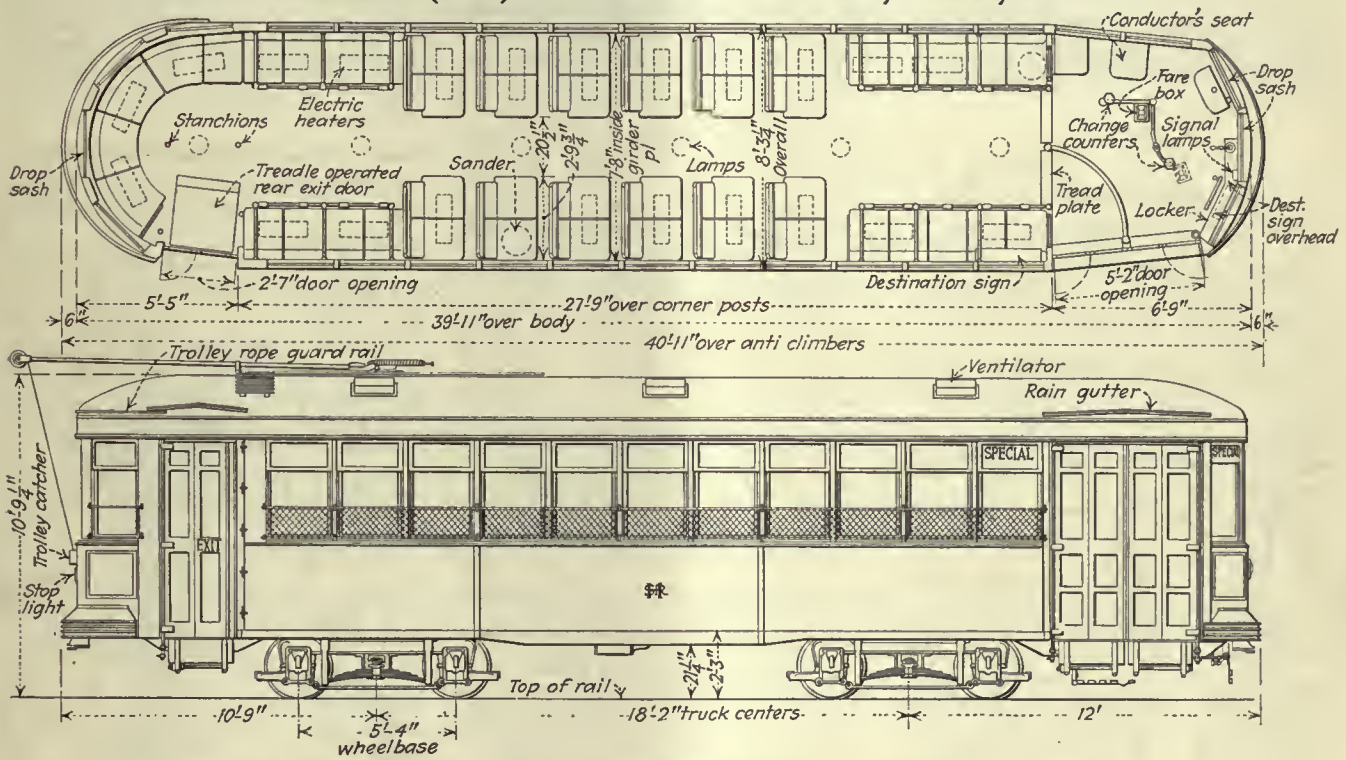
Coincident with the ordering of the new locomotives, the railroad placed orders with the American Car & Foundry Company for four new cabooses. They will be placed in service as soon as delivered by the manufacturer.

Two Officials of White Motor Company Resign

The directors of the White Motor Company at their meeting Nov. 4 voted a dividend of 50 cents per share instead of $1 per share as heretofore. The present declaration is at the rate of 4 per cent per annum. The dividend is payable Dec. 31 to stockholders of record Dec. 15.

Windsor T. White, chairman of the board, and Thomas H. White, vice-president, desired to be relieved of their

Hamilton (Ont.) Units Scheduled for Delivery on May 1



General seating plan and elevation of twelve units ordered by the Hamilton Street Railway, Hamilton, Ont., from the National Steel Car Corporation, Ltd.

Specifications have recently been released for twelve one-man, two-man, passenger, city-type, single-end, double-truck cars which were ordered in July by the Hamilton Street Railway, Hamilton, Ont., from the National Steel Car Corporation, Ltd., of that city. Mention of this order was made in the JOURNAL for Aug. 27, the first advices being that twenty cars had been ordered.

The units will have an over-all length of 40 ft. 11 in. and are designed to seat 53 passengers, five of whom can be accommodated in the gunboat rear end of the unit. The body framing will be of steel and wood with Plymetl girder plates, aluminum letter plate, stanchions and fittings. Haskelite headlining has been specified, as have Westinghouse No. 510 A-F inside-hung type L motors. Each unit will weigh 37,000 lb. Special devices are Meissner No. 267 sanders, automatic tail lights (red and green), and rear treadle exit doors. The interior trim will be of birch stained mahogany. May 1, 1928, has been set as the date of delivery. The cars are very similar to those recently ordered by the Montreal Tramways. Following are specifications released by O. H. Anderson, chief mechanical engineer the National Steel Car Corporation, Ltd.:

Name of railway	Hamilton Street Railway
City and state	Hamilton, Ont., Canada
Number of units	12
Type of unit	One-man, two-man, motor, passenger, city, single end, double truck
Number of seats	53
Builder of car body	National Steel Car Corporation, Limited
City and state	Hamilton, Ontario
Date of order	July 29, 1927
Date of delivery	May 1, 1928
Weights:	
Car body	24,300 lb.
Trucks	12,700 lb.
Total	37,000 lb.
Bolster centers	18 ft. 2 in.
Length over all	40 ft. 11 in.
Length over body posts	39 ft. 11 in.
Truck wheelbase	5 ft. 4 in.
Width over all	8 ft. 3½ in.
Height, rail to trolley base	10 ft. 9¼ in.
Window post spacing	27 in.
Body	Semi-steel
Roof	Arch
Air brakes	Westinghouse single end safety control, with variable load device roller
Armature bearings	Roller
Axles	O.H.S. 3¼ x 7 in.
Car signal system	Consolid. Car Htg. Co. buzzer equipment
Compressors	West. 600 V.D.H. 16, motor driven
Conduit	Metal
Control	West. M-35-XB
Destination signs	E. & E. spiral drive
Door mechanism	National Pneumatic Co.'s
Doors	End, folding
Fare boxes	Cleveland Model 5
Finish	Lacquer
Floor covering	Painted
Gears and pinions	Solid forged B. P. Helical
Glass	Windows—plate; doors—wired
Hand brakes	Peacock staffless type
Hand straps	Sanitary rigid retrieving type
Heat insulating material	One-ply Salamander
Heaters	Consol. Car Htg. Co.'s C-12331-G2, with thermostatic control
Headlights	Golden Glow R.M.L.-96, 600 volt
Headlining	Haskelite
Interior trim	Birch—stained mahogany
Journal bearings	A.R.A. 3½ x 7 in.
Journal boxes	3½ x 7-in. pedestal type, Symington Co.
Lamp fixtures	Automatic compensating E.S.S. Co. type "L"
Motors	West. No. 510-A-S, No. 4
Painting scheme	Green below belt, cream above belt
Roof material	Haskelite and canvas
Safety car devices	H. & B. life guards
Sash fixtures	Edwards brass sash, complete
Seating material	Spanish leather
Slack adjusters	West., Form E-1
Steps	Folding
Step treads	"Visabledg" Safkar treads
Trolley catchers	O.B. No. 13141
Trolley base	U. S. No. 13
Trolley wheels	U. S. No. 31
Trucks	C. S. side frame
Ventilators	Nichols-Lintern type C
Wheels	Solid forged, diameter 26 in.
Special devices	Meissner No. 267, Sanders automatic tail lights (red and green), rear treadle exit doo

offices because their views differed from those of the board concerning future policies of the company. Their resignations as officers, but not as directors, were accepted with regret.

Walter C. White, president, continues as the company's chief executive officer.

National Pneumatic to Furnish Macon Door Equipment

The National Pneumatic Company announces that it has been awarded the order for furnishing the door mechanism that will be used in the twelve cars being constructed by the Perley A. Thomas Car Company for the Macon Light & Railway Company, Macon, Ga. Specifications of these units were printed in the Oct. 15 issue of the ELECTRIC RAILWAY JOURNAL.

Copper More Buoyant—Zinc Weaker

Copper is more buoyant than for many months, and large sales at advancing prices are the feature of the non-ferrous metal markets. Zinc, on the other hand, continues to show weakness, and price concessions have been made by anxious sellers to get business. Shading of prices by second hands is reported in lead, which is only moderately active. Tin is easier.

Both domestic and foreign buying of copper have been excellent during the week ended Nov. 9, and prices are better. Not for a long time have there been two active weeks in succession in the domestic copper market. The past week, however, not only follows a very good week, but is the third in the last four in which sales have been excellent. Some 13¼-cent copper remained in the market on Nov. 3, but since then only a few small sales were made under 13⅜ cents and these were offset by occasional lots which brought a little more than the even ⅜ figure. Most of the producers were asking 13.50 cents Nov. 9, but business has been slim indeed. A large proportion of the buying was on account of wire drawing companies, which is an encouraging development because wire has been the weak spot in the copper market for several months. Most of the business was for delivery in November and December, but January and even February was represented. Copper exporters advanced its price again to 13.80 cents c.i.f. and offers in the f.a.s. market are available at 13.50 and 13.55 cents.

Though the principal sellers of lead have made no change in their quotations, which remain at 6.25 cents in New York and 6 cents, St. Louis, these prices have been shaded to some extent and the market cannot be called firm. The principal unsteadying influence is the weakness in London, though prices there have shown marked resistance to further decline whenever the price for prompt metal reaches £20⅛. Though the American Smelting & Refining Company contract price remains at 6.25 cents, New York, an occasional lot has been sold at 6.20 and 6.225 cents. In the Middle West dealers have sold as low as 5.975 cents. The market has been rather inactive.

Sellers of zinc do not appear to be overly optimistic and they have been cutting prices during the week to get business. On Nov. 8 and 9 sales were made at 5.60 cents and it is possible that this may have been shaded. High-grade has been sold at 7.75 cents, New York, for small lots of spot metal.

The tin market has been quiet all week and prices have declined to below 57 cents, the lowest level reached since the middle of 1925. On Nov. 9 price of prompt Straits was 56¼ cents, with far-forward shipment about ¾ cent less.

METAL, COAL AND MATERIAL PRICES
F. O. B. REFINERY

Metals—New York	Nov. 8, 1927
Copper, electrolytic, cents per lb.	*13.15
Copper wire, cents per lb.	*15.25
Lead, cents per lb.	* 6.225
Zinc, cents per lb.	* 6.00
Tin, Straits, cents per lb.	*56.50
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tone	$4.075
Somerset mine run, Boston, net tons	1.90
Pittsburgh mine run, Pittsburgh, net tons	1.825
Franklin, Ill., screenings, Chicago, net tons	1.55
Central, Ill., screenings, Chicago, net tons.	1.125
Kansas screenings, Kansas City, net tons	2.175
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	*5.50
Weatherproof wire base, N.Y., cents per lb.	*16.00
Cement, Chicago net prices, without bags	2.05
Linseed oil (5-bbl. lots), N. Y., cents per lb.	10.0
White lead in oil (100-lb. keg), N. Y., cents per lb.	13.75
Turpentine (bbl. lots), N. Y., per gal.	$0.52

*Nov. 7 prices.

TRACK AND LINE

NORTHERN TEXAS TRACTION COMPANY, Fort Worth, Tex., has begun improvement work on the Arlington Heights car line between Montgomery and Sanguinet Streets. The work consists in lowering the double track line to the new level of the street which will obtain when the city's paving program is carried out, laying of new track and ties where replacements are needed, paving of street intersections and installation of modern ornamental steel poles between the tracks to carry the trolley wires. The cost is placed at $125,000.

TRADE NOTES

ANACONDA COPPER MINING COMPANY, New York, announces that C. S. Anderson has been appointed electrical engineer for rod, wire and cable products. Mr. Anderson was formerly sponsor engineer of the Electric Bond & Share Company, New York, for Louisiana, Mississippi and Arkansas.

GEORGE N. BROWN, formerly vice-president and sales manager of the Pittsburgh Transformer Company, has joined the Ohio Brass Company as manager of high-tension sales. Mr. Brown was graduated from Cornell in electrical engineering and, until the World War, was with the New York State Railways. He served overseas in the army and upon his return to civil life started with the Pittsburgh Transformer Company.

WHITE COMPANY, Cleveland, Ohio, recently opened its new branch sales and service building in Los Angeles, Cal. The building, of cement and brick construction, is located at 435 East Twentieth St., with entrances on Washington Boulevard and Maple Avenue. It has 132,000 sq.ft. of floor space and is equipped with most modern shop machinery and service facilities. It was constructed at a cost of $500,000. Four other White branches that were being constructed at that time, in the Bronx, N. Y.; Providence, R. I.; Hartford, Conn., and Syracuse, N. Y., were expected to be ready for occupancy during November.

ADVERTISING LITERATURE

BAKER-RAULANG COMPANY, Cleveland, Ohio, has issued bulletin No. 110, describing the Baker "railroad special" bus bodies.

CANADIAN NATIONAL SAFETY LEAGUE, Toronto, has issued three illustrated bulletins entitled "Make Haste Slowly," "Use a Flashlight, It Is Safer" and "The Everlasting Question—Why?" confined to safety on construction work, the prevention of fires and automobile accidents, respectively.

ALLEN-BRADLEY COMPANY, Milwaukee, Wis., has issued a series of bulletins describing: Type J-3064 automatic slip-ring motor starter, H-1864 slip-ring motor starter, H-2052 semi-automatic resistance starter, J-1552 alternating-current contactor, E-2100 and E-2200 controlling rheostats, J-1552 Form B across-the-line starting switch and J-1552 Form R and RM alternating-current reversing switch. In the text the important features of the apparatus are stressed, application, operation and construction being specifically treated in some instances.

ROLLER-SMITH COMPANY, New York City, has issued supplement No. 1 to bulletin No. 300 describing type Com ohmmeter and type HTD circuit tester.

GENERAL ELECTRIC COMPANY, Schenectady, N. Y., has issued the following loose-leaf bulletins: Type FT normal starting torque for full voltage starting general purpose squirrel cage motors, magnetic reversing switches CR7009-W3 and CR7009-W4 for alternating current, CR2927 pressure and vacuum switches for a.c. and d.c. circuits, and CR4771 and CR4772 duplex controllers for constant-speed d.c. motors driving pumps.

OHIO BRASS COMPANY, Mansfield, Ohio, has issued folder 143 CB stressing the importance of small economies. Among the products pictured and described in it are O-B trolley retriever, form 4 base; trolley catcher, section in sulator, and portable arc welder.





—and on Springfield and Worcester Latest Light-weight City Type Cars they repeated on "Peacock" Staffless Brakes!

Reg. U. S. Pat. Off.

Fifty of these new type city cars, equipped with "Peacock" Staffless Brakes, and built by the Wason Manufacturing Company, were recently placed in service by the Springfield Street Railway Company. A like number of the same type car, similarly equipped and built by the Osgood-Bradley Car Company were also placed in operation by the Worcester Consolidated Street Railway.

Let us tell you why the users of "Peacock" Staffless Brakes repeat whenever new equipment is ordered!

National Brake Co., Inc.

890 Ellicott Sq., Buffalo, N. Y.

Canadian Representative

Lyman Tube & Supply Company, Limited, Montreal, Canada



Spacious interior of the Worcester cars which reveals some of the passenger comforts



Interior view of one of the Springfield units, showing roomy and attractive features

If you use pneumatic tires

you want this rim



A BASIC advance in rim design, a new epoch in tire usage for truck and bus transportation—that's the meaning of this Goodyear Type K Rim Equipment.

To truck manufacturers: Exhaustive tests in actual use point to this rim as eventual factory equipment for pneumatic-tired trucks. We offer you co-operation in any kind of test.

To truck owners and operators: If your operating conditions call for a change-over from solid to pneumatic tires—single or dual rears—this equipment will do the job in the most efficient, economical and practical way.

To truck dealers and tire dealers: Every distributor and dealer owes it to himself to learn the advantages offered by this equipment. Rim distributors co-operate in adapting wheels.

Outstanding advantages of the Goodyear Type K Rim:

1. Simplicity and ease of operation in tire changing.
2. Adaptability to all types of wheels—single or dual.
3. Lightness with strength.
4. Economy of replacement.
5. Reduction of brake-drum heat through use of ventilated wheels. Saving of tires.

Consists of but two parts—one endless section and one split section. Makes all pneumatic tires quickly detachable as well as *demountable at the rim.* Offers a complete range of sizes.

Developed by Goodyear engineers, made exclusively in the Goodyear shops, widely accessible through rim distributors. Your permanent satisfaction pledged by The Greatest Name in Rubber. Illustrated booklet gladly sent upon request. Write Goodyear, Akron, Ohio, or Los Angeles, California.

GOODYEAR

Copyright 1927, by The Goodyear Tire & Rubber Co., Inc.

Type K Truck & Bus Rim Equipment



One of the fifteen street cars whose interiors and exteriors were finished in Duco by the St. Louis Car Company for the Utah Light and Traction Company of Salt Lake City.

Duco Delivers Honest Service

Whether Duco is applied to interiors where it is expected to maintain its good appearance through years of service,—whether it is applied to exteriors where it is expected to withstand the rigors of climate, Duco delivers an honest job.

In fact, the admiration Duco arouses gradually turns to astonishment as months go by and Duco continues to deliver a plus value over and above the most hopeful expectations of its users.

There is a pleasant surprise in store for the operators of Electric Railway Equipment who have not yet learned the true economy of a Genuine Duco finish.

DU PONT DUCO
REG. U.S. PAT. OFF.

There is only ONE DUCO
. . . DU PONT DUCO

Duco is the correct finishing material for railway equipment. For information write to E. I. du Pont de Nemours & Co., Inc., Chemical Products Division, Parlin, N. J., 2100 Elston Ave., Chicago, Ill., 569 Madison St., San Francisco, Cal.

PAINTS - VARNISHES - ENAMELS - DUCO

AIR—and air *alone* can absorb and thus practically eliminate road shocks and vibration.

These two destructive forces cost truck and bus operators who ignore them hundreds of thousands of dollars every year in unnecessary maintenance expense and repair bills—



GRÜSS
Sleeve Type
AIR SPRING



WESTINGHOUSE
Piston Type
AIR SPRING

THE SHOCK ELIMINATORS FOR TRUCKS-BUSSES-PASSENGER CARS

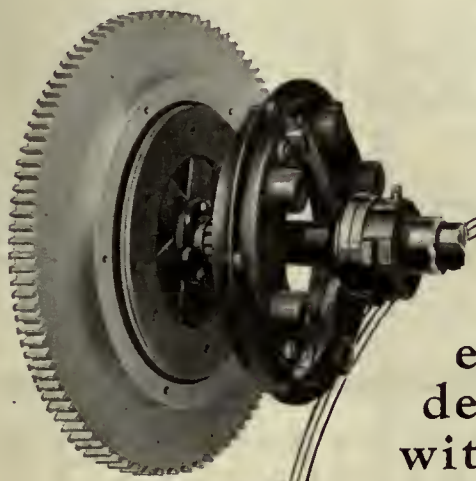


AIR Springs float the bus or truck chassis on cushions of air. These air cushions absorb road shocks and vibration, prevent twisting and wrenching of frame, eliminate shifting of load and damage to cargo, insure supreme riding comfort regardless of road conditions.

Thousands of truck and bus operators in all parts of the world have found the savings thus effected make air springs the greatest dividend payer they have in connection with their equipment.

The CLEVELAND PNEUMATIC TOOL COMPANY
Cleveland, Ohio

CO-OPERATION



Our engineering department, with its many years of experience in designing Long clutches and radiators, welcomes the opportunity to co-operate with manufacturers.

LONG MANUFACTURING COMPANY
DETROIT, MICH.



LONG

Pa. to Florida··· deal *closed* in 3 mins.



A PHILADELPHIA real estate man was seeking to buy a suburban property, but the woman who owned it was visiting in Florida. Letter after letter failed to secure the necessary terms. Then, to make matters worse, he learned that a competitor was after the property. He called the owner by Long Distance, got her promptly, and in 3 minutes settled the terms and made the purchase. Charges, $4.60. Amount involved, $25,000.

THOUSANDS OF TIMES DAILY, the long distance telephone renders a similar service to American business. Is a man too busy to leave his office? Does he dread a long trip? Is there an emergency? Is time important? Is it desirable to save expense? Long distance calls are the answer. Nearly any negotiation, purchase or sale that can be made face to face can be made in person by telephone.

The every-day use of the telephone for distant calls realizes many opportunities that otherwise would be lost. We suggest now that call across the state or continent that will clear up some pending transaction. We believe you will be surprised how little it will cost. . . . . *Number, please?*

BELL LONG DISTANCE SERVICE

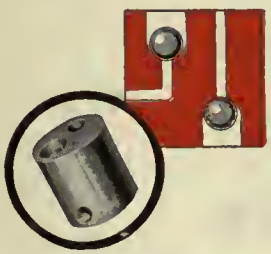
BELL SYSTEM
AMERICAN TELEPHONE & TELEGRAPH CO.
AND ASSOCIATED COMPANIES



"Motortruck" Jack Model C9 (7-ton) lifts from 9 in. low to 14 in. high. Model C11 (7-ton) lifts from 11 in. low to 18 in. high. Model D11 (12-ton) lifts from 11 in. low to 17¾ in. high.

"Motorcoach" Jack, Model C8.5, is 7-ton capacity and lifts from 8½ to 17 in. Has hand extension.

Sturdy, rugged jacks built for years of heavy duty.



TWIN-CHEK Valve Unit automatically controls the hydraulic oil-power. Located below the pump (outside the jack), easily accessible. PATENTED.

Hydraulic Jacking

Lifts *without* Labor

THERE'S no labor to jacking up a fully loaded bus with a Blackhawk. Gentle strokes of the long handle, and up she goes. Unbelievably easy!

Bayonet-lock handle holds jack securely for easy placing under any axle. Even the shortest strokes raise the load. To lower, simply turn the release valve with handle tip and down she comes, quickly and smoothly—no pumping.

Blackhawk Bus Jacks are low enough for any front axle, with tire flat. Ample lift for any rear end. Never any need to unload passengers or crawl under.

Endorsed by leading bus and fleet operators—Pickwick alone uses 800. Write for details and prices.

BLACKHAWK MFG. COMPANY

Dept. E.J., Milwaukee, Wis.

Mfrs. of Blackhawk Wrenches and Pumps

Bumpers and platforms are no obstacles. Setting the jack, pumping the handle, lowering the load—all an easy one-man job. Not a passenger is disturbed. No soiled uniforms.

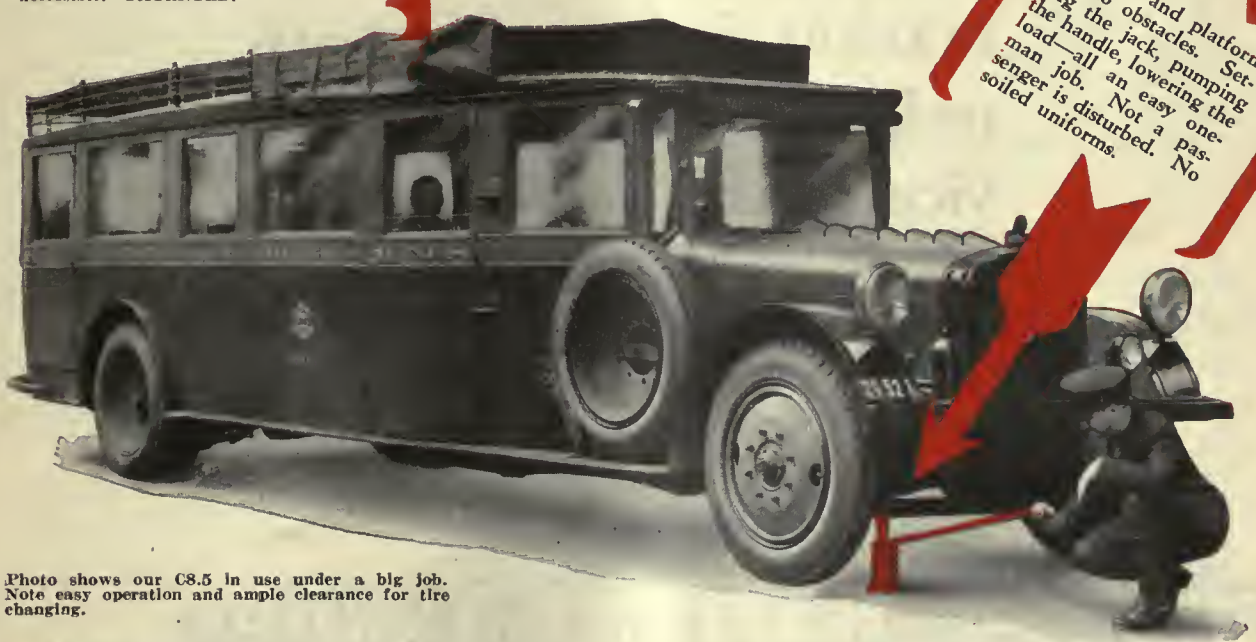
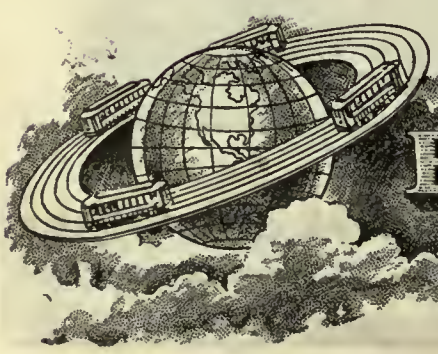


Photo shows our C8.5 in use under a big job. Note easy operation and ample clearance for tire changing.

BLACKHAWK JACKS HYDRAULIC OIL-POWER

JUST as the electric railway companies have to compile and be guided by exhaustive statistics as to peak loads, traffic densities, costs per mile, and so forth, we must constantly keep ourselves informed as to purchasing power, density of population and all vital market information in order to maintain our service as an active asset of your service.



Barron G. Collier
INCORPORATED
CANDLER BLDG. NEW YORK

plush

for—appearance
endurance
cleanliness
comfort



for **MODERN CAR UPHOLSTERY**
you can't do better than
PLUSH!

No photograph can give a true idea of the richness and beauty of Massachusetts Genuine Mohair Plush. But we say, without hesitation, that from the range of colorings and patterns now being made, you can select plush for upholstery in keeping with the most luxurious of car interiors.

With Massachusetts Mohair Plush, a pile fabric, the grind of wear is distributed over the *ends* and not the sides of its tough, springy fibers. Twenty years of active railroad service is nothing unusual for this plush!

A more economical seat covering, or one more easy to keep clean, cannot be bought.

Samples and Quotations on Request.

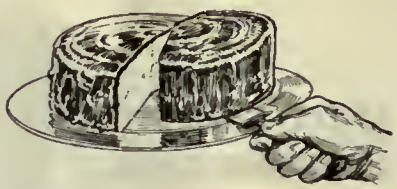
MASSACHUSETTS MOHAIR PLUSH CO.
Main Office:
80 Federal St., Boston, Mass.

Makers of BAY STATE PLUSH

New York Agent:
Sisson Supply Co.
1845 Grand Central Terminal,
New York City

Western Agent:
Midgley & Borrowdale
1822 McCormick Building,
Chicago, Illinois

MASSACHUSETTS MOHAIR PLUSH
The railroad standard for over 35 years



One INDUSTRIAL ADVERTISER *captured 40% of a rich market*

FIVE years ago an important industrial change appeared on the horizon. It meant a new market and new profits. At that time it was anybody's market, a new field for all, with no established leader.

A score of producers saw the opportunity, but one alert manufacturer nominated himself for the post of leadership. During the period when buyers were testing, comparing and experimenting with his and competing products, this manufacturer dominated buyers' thoughts by the forceful use of Industrial Advertising.

By so doing, this manufacturer "beat the gun" in the rush to the new field of profits. In 1926, after four years of Industrial Advertising, 46 per cent of all buyers in this particular field were his customers. His output constituted 40 per cent of all sales to this market last year. Over the four-year period, when competitors were fluctuating up and down in rank, strong Industrial Advertising kept this one manufacturer entrenched in the lead.

Industrial Advertising vs. "Using Space"

His competitors also advertised but this manufacturer continuously used the most effective space units of Industrial Advertising to win this new industry's recognition of his product. His advertising appropriation was large enough each year to carry on the leadership job originally mapped out. His copy reflected an intimate knowledge of the buyers' problems and talked their language. There was no stinting of effort in obtaining and presenting vital performance facts. Industrial advertising men combed the field for data before the advertising copy was prepared.

This advertising was published almost exclusively in two McGraw-Hill Publications that are recognized for the vital guidance and help they have given to the industry that constituted this manufacturer's market.

In this case the persistent use of liberal space was true economy and extremely effective. It not only hastened the industrial change and gained for the manufacturer that much-desired buyers' recognition, but it is now enabling him to hold the lead and advance to still greater sales volume.

Details Differ, But Not Fundamentals

Your industrial selling problem may differ in detail from the case cited. One set of circumstances demands dominant Industrial Advertising from the start; another situation may recommend a different program. The proper procedure in any case is more easily determined when the McGraw-Hill book, "Industrial Marketing at Work," is studied, and its basic principles applied. This book is based on a study of numerous cases in which the Four Principles of Industrial Marketing have been used.

If your markets lie within any field of industry broader than your strictly local territory, a McGraw-Hill representative will be glad to discuss this study and leave with you or your advertising agent a complimentary copy. Your request should be directed to the nearest McGraw-Hill office.



This advertisement is being published in the McGraw-Hill Publications, Printers Ink Monthly, Advertising and Selling, Class and Industrial Marketing, Finance and Industry, Standard Rate and Data Service, New York Times, New York Herald Tribune, Boston News Bureau and Chicago Journal of Commerce.

McGRAW-HILL PUBLISHING COMPANY, INC., NEW YORK, CHICAGO, PHILADELPHIA, CLEVELAND, ST. LOUIS, SAN FRANCISCO, LONDON. PUBLISHERS OF

McGRAW-HILL *Publications*

Electrical
ELECTRICAL WEST
ELECTRICAL WORLD
ELECTRICAL MERCHANDISING

Construction & Civil Engineering
ENGINEERING NEWS-RECORD
CONSTRUCTION METHODS

Industrial
POWER
AMERICAN MACHINIST
INDUSTRIAL ENGINEERING
CHEMICAL & METALLURGICAL ENGINEERING

Catalogs and Directories
McGRAW-HILL ELECTRICAL ENGINEERING CATALOG
McGRAW-HILL ELECTRICAL TRADE CATALOG — McGRAW CENTRAL STATION DIRECTORY
KEYSTONE COAL MINING CATALOG — McGRAW ELECTRIC RAILWAY DIRECTORY
KEYSTONE METAL QUARRY CATALOG — METAL QUARRY DIRECTORY
KEYSTONE COAL BUYERS CATALOG — COAL FIELD DIRECTORY
BONBRIGHT SURVEY OF ELECTRIC POWER & LIGHT COMPANIES IN THE U. S.

Radio
RADIO RETAILING

Transportation
BUS TRANSPORTATION
ELECTRIC RAILWAY JOURNAL

Mining
COAL AGE
COAL AGE NEWS
ENGINEERING & MINING JOURNAL

Overseas
INGENIERIA INTERNACIONAL
AMERICAN MACHINIST
(EUROPEAN EDITION)

48,000 PAGES USED ANNUALLY BY 3,500 INDUSTRIAL ADVERTISERS TO HELP INDUSTRY BUY MORE INTELLIGENTLY

VIZABLEDG
PATENTED
SAFKAR
TRADE MARK REG.
SAFSTEP



Step maintenance and replacement costs cease when **"Safkar"** Steps are installed. All-steel, self-contained units, their non-slipping surface is an integral part of them, as lasting as the steel itself. The open mesh makes it a natural foot-scraper—car cleaning costs are reduced.

Have you Bulletin D-28?

IRVING IRON WORKS CO.
LONG ISLAND CITY, N.Y. U.S.A.
Established in 1902
SALES OFFICES IN ALL PRINCIPAL CITIES
See Your Telephone Book for Local Address



CHOTA HAZRI

The Kaffir's test of character, stamina and integrity is the meal (chota hazri).

The fellow with the biggest appetite gets the important post.

Thus a man's job is reached through his stomach.

And we've noticed that sometimes the operators of electric machines try to qualify in similar manner.

They equip their machines with a heterogeneous medley of nondescript carbon brushes and after they've had a belly full of the troubles that such a conglomeration superinduces they feel that they've qualified for an important change.

And THEY *have!!*

They've qualified for an engineering prescription of Morganite Brushes.

Morganite Brush Co., Inc.

Main Office and Factory
3302-3320 Anable Ave., Long Island City, N. Y.

DISTRICT ENGINEERS AND AGENTS

Pittsburgh, Electrical Engineering & Mfg. Co., 909 Penn Ave.
Cincinnati, Electrical Engineering & Mfg. Co., 607 Mercantile Library Building.
Cleveland, Electrical Engineering & Mfg. Co., 422 Union Building.
Baltimore, O. T. Hall, Sales Engineer, 437-A Equitable Building.
Revere, Mass., J. F. Drummey, 75 Pleasant Street.
Los Angeles, Electrical Engineering Sales Co., 502 Delta Building.
San Francisco, Electrical Engineering Sales Co., 222 Underwood Building. 545 Market Street.
Toronto, Can., Railway & Power Engineering Corp., Ltd., 101 Eastern Ave.
Montreal, Can., Railway & Power Engineering Corp., Ltd., 326 Craig St., West.
Winnipeg, Can., Railway & Power Engineering Corp., Ltd., P. O. Box 325.



A Bigger Dollar

EVERY dollar spent for poles or ties is a bigger dollar when it buys Amcreco products.

Amcreco stands for a quality of timber and a degree of perfection in treatment that insure minimum pole and tie cost per year.

You buy service—not just sticks of timber. Since a dollar spent for these Amcreco creosoted southern yellow pine products buys more service, it *is* a bigger dollar.

We will be glad to help you work out an economical pole or tie program to meet your conditions.

Five reasons why Amcreco products can cut annual charges

1. Careful selection of timber.
2. Proper seasoning under ideal conditions and close supervision.
3. Unequalled plant facilities (17 plants in operation).
4. Uninterrupted supply of pure creosote oil under our own control from producer to treating plant.
5. Unqualified backing of the product by an institution of proven integrity.

AMERICAN CREOSOTING COMPANY
INCORPORATED

COLONIAL CREOSOTING COMPANY INCORPORATED

AMCREO LOWRY PROCESS CREOSOTED WOOD

GEORGIA CREOSOTING COMPANY INCORPORATED

LOUISVILLE ~ KENTUCKY

SALES OFFICES:

332 So. Michigan Ave. Chicago
350 Madison Ave. New York City
401 W. Main St. Louisville, Ky.
Brunswick, Ga. Bogalusa, La.

HRJ11-12Gray

Protect your TRAFFIC REVENUE



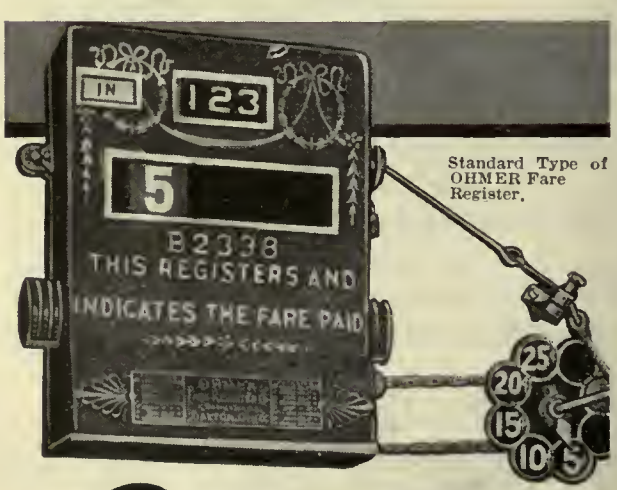
OHMER No. 79 Ticket - Printing Register. Furnished for either manual or electric operation.

OHMER Fare Registers do more than insure the collection of the proper fares. They also keep an exact, concise, detailed record of each transaction. They enforce correct accounting and greatly simplify the task of auditing.

No matter what the nature of your passenger service, there are OHMER Fare Registers and OHMER Ticket Printing Devices that will fully meet your requirements in regard to safeguarding traffic revenues.

Tell us about your operating conditions and let us suggest an ideal system for you. We shall gladly give you the benefit of our 29 years' experience in the special field of transportation accounting. You will not be placed under any obligation by conferring with us. Write or wire today.

OHMER FARE REGISTER COMPANY
Dept. Y, Dayton, Ohio



Standard Type of OHMER Fare Register.

OHMER
REG. U.S. PAT. OFF.
Industrial Counters

266

Clean cars mean better public relations

[this year's Coffin Award winner, gets cleaner cars the Oakite way]

CLEAN, inviting cars not only inspire better public relations, but they have a definite effect upon revenue. If you advertise "clean cars"—and most railway companies do—there is no better way to substantiate your advertising than by cleaning your cars inside and out the efficient, economical Oakite way.

Follow the example of this year's Coffin Award winner, and let Oakite materials help you obtain cleaner cars, larger revenue and better public relations. Write us for particulars. No obligation.

Oakite Service Men, cleaning specialists, are located in the leading industrial centers of the U. S. and Canada

Oakite is manufactured only by
OAKITE PRODUCTS, INC., 28B Thames St., NEW YORK, N. Y.
(Formerly OAKLEY CHEMICAL CO.)

OAKITE
TRADE MARK REG. U.S. PAT. OFF.
Industrial Cleaning Materials and Methods

Make use of McGRAW-HILL BOOKS

——they bring you the recorded experience of leaders in your field.

Send for our latest catalogue

Mail this coupon today!

McGRAW-HILL FREE CATALOGUE COUPON

McGraw-Hill Book Company, Inc.,
370 Seventh Ave., New York, N. Y.

Send me the New 1927-28 McGraw-Hill Catalogue to the address given below. This catalogue is FREE, I understand.

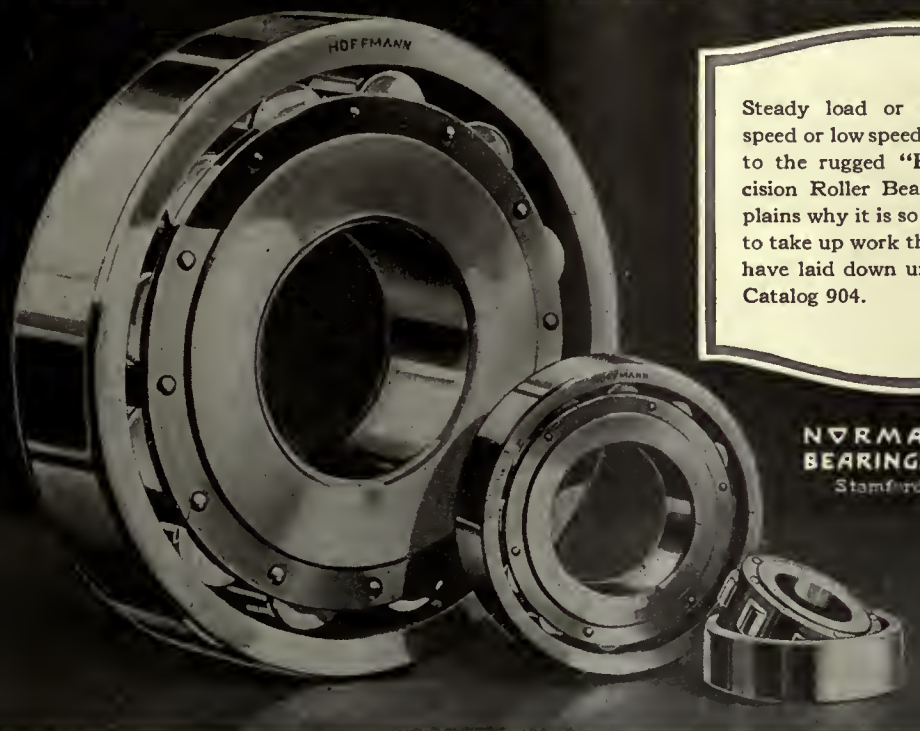
Name .....

Address .....

City & State.....

E. 11-12-27

"HOFFMANN"



Steady load or shock load, high speed or low speed—it's all the same to the rugged **"Hoffmann"** Precision Roller Bearing. Which explains why it is so often called upon to take up work that other bearings have laid down under. Ask us for Catalog 904.

NORMA-HOFFMANN
BEARINGS CORPORATION
Stamford — Connecticut

N-36

COLUMBIA MACHINE WORKS 1892

COLUMBIA

Railway Supplies and Equipment

Machine and
Sheet Metal Work

Forgings
Special Machinery
and Patterns

Grey Iron and
Brass Castings

Armature and
Field Coils.

The Columbia Machine Works *and M. I. Co.*
265 Chestnut St., corner Atlantic Ave.,
Brooklyn, New York



Structural Shapes · Steel Sheet Piling
Plates · Skelp
Bars and Bar Mill Products
Bands · Hoops
Axles · Wrought Steel Wheels
Rails · Rail Joints
Steel Cross Ties

CARNEGIE STEEL COMPANY

General Offices · Carnegie Building · 434 Fifth Avenue
PITTSBURGH PENNSYLVANIA

1839

Bankers and Engineers

Ford, Bacon & Davis
Incorporated
Engineers
115 Broadway, New York
PHILADELPHIA CHICAGO SAN FRANCISCO

The J. G. White Engineering Corporation
Engineers—Constructors
Oil Refineries and Pipe Lines, Steam and Water Power Plants, Transmission Systems, Hotels, Apartments, Office and Industrial Buildings, Railroads.
43 Exchange Place New York

STONE & WEBSTER
Incorporated
Design and Construction
Examinations Reports Appraisals
Industrial and Public Service Properties
NEW YORK BOSTON CHICAGO

THE BEELER ORGANIZATION
Transportation, Traffic, Operating Surveys
Better Service—Financial Reports
Appraisals—Management
52 Vanderbilt Ave. New York

SANDERSON & PORTER
ENGINEERS
PUBLIC UTILITIES & INDUSTRIALS
Design Construction Management
Examinations Reports Valuations
CHICAGO NEW YORK SAN FRANCISCO

ENGELHARDT W. HOLST
Consulting Engineers
Appraisals Reports Rates Service Investigation
Studies on Financial and Physical Rehabilitation
Reorganization Operation Management
683 Atlantic Ave., BOSTON, MASS.

ALBERT S. RICHEY
ELECTRIC RAILWAY ENGINEER
WORCESTER, MASSACHUSETTS
REPORTS - APPRAISALS - RATES - OPERATION - SERVICE

LINN & MARSHALL, *Inc.*
Financing — Engineering — Management
PUBLIC UTILITIES
ELECTRIC RAILWAYS — MOTOR BUSES —
GAS — ELECTRIC
25 Broadway, New York City

C. B. BUCHANAN, President — W. H. PRICE, JR., Sec'y-Treas. — JOHN F. LAYNG, Vice-President
BUCHANAN & LAYNG CORPORATION
Engineering and Management, Construction
Financial Reports, Traffic Surveys
and Equipment Maintenance
BALTIMORE 1004 Citizens National Bank Bldg. — Phone: Hanover: 2142 — NEW YORK 40 Wall Street

DAY & ZIMMERMANN, INC.
ENGINEERS
DESIGN - CONSTRUCTION - REPORTS
VALUATIONS - MANAGEMENT
NEW YORK PHILADELPHIA CHICAGO

HEMPHILL & WELLS
CONSULTING ENGINEERS
Gardner F. Wells Albert W. Hemphill
APPRAISALS
INVESTIGATIONS COVERING
Reorganization Management Operation Construction
43 Cedar Street, New York City

STEVENS & WOOD
INCORPORATED
ENGINEERS AND CONSTRUCTORS
120 BROADWAY, NEW YORK
ENGINEERING CONSTRUCTION — YOUNGSTOWN, O. — FINANCING MANAGEMENT

KELKER, DELEUW & CO.
CONSULTING ENGINEERS
REPORTS ON
Operating Problems Valuations Traffic Surveys
111 W. Washington Street, Chicago, Ill.

McCLELLAN & JUNKERSFELD
Incorporated
ENGINEERING AND CONSTRUCTION
Examinations—Reports—Valuations
Transportation Problems—Power Developments
68 Trinity Place, New York
Chicago St. Louis

E. H. FAILE & CO.
Designers of
Garages— Service Buildings—Terminals
441 LEXINGTON AVE. NEW YORK

WALTER JACKSON
Consultant on Fares and Motor Buses
The Weekly and Sunday Pass—Differential Fares—Ride Selling
Holbrook Hall 5-W-3
160 Gramatan Ave., Mt. Vernon, N. Y.

THE BABCOCK & WILCOX COMPANY

85 Liberty Street, New York

Builders since 1868 of Water Tube Boilers of continuing reliability

BRANCH OFFICES

Boston, 80 Federal Street
Philadelphia, Packard Building
Pittsburgh, Farmers Deposit Bank Building
Cleveland, Guardian Building
Chicago, Marquette Building
Cincinnati, Traction Building
Atlanta, Candler Building
Phoenix, Ariz., Heard Building
Dallas, Tex., Magnolia Building
Honolulu, H. T., Castle & Cooke Building
Portland, Ore., Gasco Building

WORKS
Bayonne, N. J.
Barberton, Ohio

Makers of Steam Superheaters since 1898 and of Chain Grate Stokers since 1893

BRANCH OFFICES

Detroit, Ford Building
New Orleans, 344 Camp Street
Houston, Texas, Electric Building
Denver, 444 Seventeenth Street
Salt Lake City, Kearns Building
San Francisco, Sheldon Building
Los Angeles, Central Building
Seattle, L. C. Smith Building
Havana, Cuba, Calle de Aguiar 104
San Juan, Porto Rico, Royal Bank Building

THE P. EDWARD WISH SERVICE

50 Church St. NEW YORK — *Street Railway Inspection* DETECTIVES — 131 State St. BOSTON

Hale and Kilburn SEATS

Better Quality Seats For Cars and Buses

Hale-Kilburn Co.
1800 Lehigh Ave., Philadelphia, Pa.

Byllesby Engineering & Management Corporation

231 S. La Salle Street, Chicago

New York — San Francisco

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

RAIL GRINDERS AND WELDERS

Railway Track-work Co., Philadelphia

682

Repetition is Reputation

Hubbard and COMPANY
Pittsburgh Oakland Chicago

UNA RAIL JOINTS
DYNAMOTORS
WELDING ROD
UNA Welding & Bonding Co.
Cleveland, Ohio.

PS HEATERS

Car Heating and Ventilating

—are no longer operating problems. We can show you how to take care of both with one equipment. The Peter Smith Forced Ventilation Hot Air Heater will save, in addition, 40% to 60% of the cost of any other car heating and ventilating system. Write for details.

The Peter Smith Heater Company
6209 Hamilton Ave., Detroit, Mich.



Boyerized Parts:

Brake Pins
Brake Hangers
Brake Levers
Pedestal Gibs
Brake Fulcrums
Turnbuckles
Center Bearings
Side Bearings
Spring Post Bushings
Spring Posts
Bolster and Transom Chafing Plates
Manganese Brake Heads
Manganese Truck Parts
Bushings
Bronze Bearings
McArthur Turnbuckles

Can be purchased through the following representatives:

Economy Electric Devices Co.
72 W. Van Buren St., Chicago, Ill.
F. F. Bodler,
903 Monadnock Bldg., San Francisco, Cal.
W. F. McKenney,
54 First Street, Portland, Oregon.
J. H. Denton,
1328 Broadway, New York City, N. Y.
A. W. Arlin,
519 Delta Bldg., Los Angeles, Cal.

Bemis Car Truck Company
Springfield, Mass.

TULC LUBRICANT

We make a specialty of
ELECTRIC RAILWAY LUBRICATION
We solicit a test of TULC on your equipment
The Universal Lubricating Co.
Cleveland, Ohio
Chicago Representatives: Jameson-Ross Company, Straus Bldg.

Why Le Carbone Carbon Brushes?



Reason No. 13

They last so much longer and avoid so much trouble and expense with more costly items of equipment that they repay your total brush investment many times each year.

They talk for themselves

W. J. Jeandron
Factory Terminal Bldg.
Fifteenth Street, Hoboken, N. J.
Pittsburgh Office: 634 Wabash Bldg.
Chicago Office: 1657 Monadnock Block
San Francisco Office: 525 Market Street
Canadian Distributors: Lyman Tube & Supply Co., Ltd.
Montreal and Toronto

"STANDARD STEEL PRODUCTS"

"SSI"

Steel Axles Steel Springs
Armature Shafts
Rolled Steel Wheels

STANDARD STEEL WORKS COMPANY
PHILADELPHIA, PA.
BRANCH OFFICES
CHICAGO NEW YORK PORTLAND SAN FRANCISCO ST. LOUIS
PITTSBURGH HOUSTON RICHMOND ST. PAUL MEXICO CITY
WORKS: BURNHAM, PA.



JOHNSON FARE COLLECTING SYSTEMS

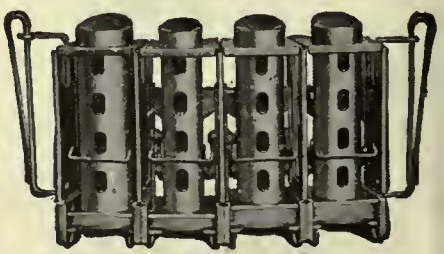


Johnson Electric Fare Boxes and overhead registers make possible the instantaneous registering and counting of every fare. Revenues are increased 1½ to 5% and the efficiency of one-man operation is materially increased. Over 4000 already in use.

When more than two coins are used as fare, the Type D Johnson Fare Box is the best manually operated registration system. Over 50,000 in use.

Johnson Change-Makers are designed to function with odd fare and metal tickets selling at fractional rates It is possible to use each barrel separately or in groups to meet local conditions. Each barrel can be adjusted to eject from one to five coins or one to six tickets.





Johnson Fare Box Co.
4619 Ravenswood Ave., Chicago, Ill.

PRETTYMAN PRESERVED P27 FOREST PRODUCTS

From forest to you

Prettyman facilities consist not only of a vast, modern creosoting plant for making your structural timber as everlasting as wood can be made.

They include everything that is required, from the careful selection of the finest timbers from Prettyman forests to the loading of your shipment, ready for use.

CREOSOTED

Railroad Cross-ties; Switch-ties; Bridge Timbers; Construction Timbers; Mine Timbers; Lumber; Piling; Poles; Posts and other Forest Products

J. F. Prettyman & Sons
Wood Preserving Plant
Charleston, S. C.

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.

Positions Vacant and all other classifications, 8 cents a word, minimum charge $2.00.

Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.

Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

1 to 3 inches.....$4.50 an inch
4 to 7 inches..... 4.30 an inch
8 to 14 inches..... 4.10 an inch

Rates for larger spaces, or yearly rates, on request.

An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

POSITION VACANT

MANAGER: for prompt engagement with combined electric railway and motor bus operation in east central state, having fifty miles of operation; must be trained technician, with experience in dealing with public relationships and labor; reply with full particulars covering training, experience and references. P-58, Electric Railway Journal, 1600 Arch St., Phila., Pa.

POSITIONS WANTED

EXECUTIVE — College graduate with 5 years proven record of efficient maintenance of bus fleets, wishes good connection. Familiar with Yellow-White, Pierce-Safeway, Mack and Dodge. Salary secondary. PW-59, Electric Railway Journal, Tenth Ave. at 36th St., New York.

GENERAL superintendent or manager; fifteen years' successful experience. PW-55, Electric Railway Journal, Tenth Ave. at 36th St., New York.

POSITIONS WANTED

SUPERINTENDENT transportation; wide experience, successful record, city and interurban operation, desires position. High grade reference. PW-60, Electric Railway Journal, Tenth Ave. at 36th St., New York.

SALESMAN AVAILABLE

SALES executive, formerly Eastern manager of prominent railway equipment house, seeks a connection with well established company desiring to increase its railway sales and be adequately represented in the East; he is 36 years of age, has a keen mechanical mind, is a proven executive, can direct a sales organization, understands the railway equipment business thoroughly and is well known in the industry; his sales contacts include all mechanical executive, purchasing agents, shop foremen, etc., in both the steam and electric railway field in addition to the various car builders. SA-57, Electric Railway Journal, Tenth Ave. at 36th St., New York.

FOR SALE

15 BIRNEY SAFETY CARS

Brill Built
West. 508 or G. E. 264 Motors
Cars Complete—Low Price—Fine Condition
ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

SEARCHLIGHT SERVICE SECURES SATISFACTORY SALES

CURTAIN SUPPLY CO.

Moving to larger office same building will sublet present office 583 square feet including private office all over-looking Hudson River.

50 Church St., Hudson Terminal Bldg., New York City

Saving is a good habit, BUT—

Why Save Things You'll Never Use?

WHY let Mother Nature grow grass between the wheels of replaced cars? Why pile up rails, shop equipment, power plant equipment, line equipment, car appliances, road building material, etc., etc., you will never use again?

TODAY you can turn them over at a fair price. Tomorrow they will be—JUNK. Is it not the better part of good horse-sense to dispose of them NOW?

6000 other electric railway men will see your advertisements of used or surplus equipment and materials here—in the Searchlight Section of their business paper.

Some of these men—officials or executives of other lines in other parts of the country and operating under different conditions—can use what you no longer need. For an insignificant investment you can tell these others what you have. And they will buy.

One "Searchlight" advertiser wrote, "We can cheerfully recommend the Searchlight Section as a wonderful medium for reaching buyers of rails and equipment." Another—"The strongest proof that your 'Searchlight' finds its way to many readers is shown by the numerous letters we have received in answer to our recent ad."

Let us tell you the cost of advertising your used or surplus equipment and materials in the Searchlight Section. Just address a list of what you have to dispose of to the

Searchlight Department
ELECTRIC RAILWAY JOURNAL
Tenth Ave. at 36th St., New York, N. Y.

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Brakes
General Electric Co.
Westinghouse Air Brake Co.

Air Springs
Cleveland Pneumatic Tool Co.

Anchors, Guy
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M Co.

Armature Shop Tools
Columbia Machine Works
Elec. Service Supplies Co.

Automatic Return Switch Stands
Ramapo Ajax Corp.

Automatic Safety Switch Stands
Ramapo Ajax Corp.

Axles
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Cincinnati Car Co.
Illinois Steel Co.
St. Louis Car Co.
Standard Steel Works
Westinghouse E. & M. Co.

Axles (Front, Rear) Motor Truck & Passenger Car
Timken-Detroit Axle Co.

Axles, Trailer, Motor Bus
Timken-Detroit Axle Co.

Babbitting Devices
Columbia Machine Works & M. I. Co.

Badges and Buttons
Elec. Service Supplies Co.
International Register Co.

Barges, Steel
American Bridge Co.

Batteries, Dry
Nichols-Lintern Co.

Bearings and Bearing Metals
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
St. Louis Car Co.
Westinghouse E. & M. Co.

Bearings, Ball
Norma-Hoffman Bearings Corp.

Bearings, Center and Roller Side
Cincinnati Car Co.
Columbia Machine Works
Stucki Co., A.

Bearings, Roller
Norma-Hoffman Bearings Corp.

Bells and Buzzers
Consolidated Car Heating Co.

Bells and Gongs
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
St. Louis Car Co.

Benders, Rail
Railway Trackwork Co.

Body Material, Haskelite Plymetl
Haskelite Mfg. Corp.

Bodies, Bus
Brill Co., The J. G
Cummings Car & Coach Co.
St. Louis Car Co.

Boilers
Babcock & Wilcox Co.

Bolts & Nuts, Track
Illinois Steel Co.

Bond Testers
American Steel & Wire Co.
Electric Service Supplies Co.

Bonding Apparatus
American Steel & Wire Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.

Bonds, Rail
American Steel & Wire Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Book Publishers
McGraw-Hill Book Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, etc.)
American Bridge Co.
Batee Expanded Steel Truss Co.
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Brill Co., The J. G
Cincinnati Car Co.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Lining, Asbestos
Johns-Manville Corp.

Brake Shoes
American Brake Shoe & Foundry Co.
Bemis Car Truck Co.
Brill Co., The J. G.
St. Louis Car Co.
Taylor Electric Truck Co.

Brake Testers
National Ry. Appliance Co.

Brakes, Brake Systems and Brake Parts
Bemis Car Truck Co
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
General Electric Co.
National Brake Co.
St. Louis Car Co.
Westinghouse Tr. Br. Co.

Brakes, Magnetic Rail
Cincinnati Car Co.

Bridges, Steel
American Bridge Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
LeCarbone Co.
Morganite Brush Co.
Westinghouse E. & M. Co.

Brushes, Graphite
Morganite Brush Co.

Brushholders
Columbia Machine Works
General Electric Co.

Buildings, Steel
American Bridge Co.

Building Materials, Fireproof
Johns-Manville Corp.

Bulkheads
Haskelite Mfg. Corp.

Bunkers, Coal
American Bridge Co.

Buses
Cummings Car & Coach Co.
General Electric Co.
International Motor Co., Mack Trucks

Bus Lighting
National Ry. Appliance Co.

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works
St. Louis Car Co.

Cables (See Wires and Cables)

Cambric Tapes, Yellow and Black Varnish
General Electric Co.
Irvington Varnish & Ins. Co.

Carbon Brushes (See Brushes, Carbon)

Car Lighting Fixtures
Elec. Service Supplies Co.

Car Panel Safety Switches
Consolidated Car Heating Co.
Westinghouse E. & M. Co.

Car Steps, Safety
Cincinnati Car Co.
Irving Iron Works

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Cars, Dump
Brill Co., The J. G.
Differential Steel Car Co.
St. Louis Car Co.

Cars, Gas-Electric
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co.

Cars, Gas, Rail
Brill Co., The J. G.
St. Louis Car Co.

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Cincinnati Car Co.
Cummings Car & Coach Co.
Kuhlman Car Co., G. C.
St. Louis Car Co.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Cars, Self-Propelled
Brill Co., The J. G.

Castings, Brass Composition or Copper
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.

Castings, Gray Iron and Steel
American Bridge Co.
American Steel Foundries
Bemis Car Truck Co.
Columbia Machine Works & M. I. Co.
St. Louis Car Co.
Standard Steel Works

Castings, Malleable & Brass
Bemis Car Truck Co.
Columbia Machine Works & M. I. Co.
St. Louis Car Co.

Catchers and Retrievers, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas N.

Catenary Construction
Archbold-Brady Co.

Ceiling Car
Haskelite Mfg. Corp.

Ceilings Plywood Panels
Haskelite Mfg. Corp.

Cements, High Temperature
Johns-Manville Corp.

Chairs, Parlor Car
Heywood Wakefield Co.

Change Carriers
Cleveland Fare Box Co.
Electric Service Supplies Co.

Change Trays
Cincinnati Car Co.

Circuit-Breakers
General Electric Co.
Westinghouse E. & M. Co.

Clamps and Connectors for Wires and Cables
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Westinghouse E. & M. Co.

Cleaners
Oakite Products Co.

Cleaners and Scrapers Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Cincinnati Car Co.
Ohio Brass Co.
St. Louis Car Co.

Clutches
Long Mfg. Co.

Coil Banding and Winding Machines
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

Coils, Armature and Field
Columbia Machine Works & M. I. Co.
General Electric Co.
Westinghouse E. & M. Co.

Coils, Choke and Kicking
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Coin Changers
Johnson Fare Box Co.

Coin Counting Machines
Cleveland Fare Box Co.
International Register Co.
Johnson Fare Box Co.

Coin Sorting Machines
Cleveland Fare Box Co.
Johnson Fare Box Co.

Coin Wrappers
Cleveland Fare Box Co.

Commutator Slotters
Columbia Machine Works
Elec. Service Supplies Co.
Westinghouse E. & M. Co.
Wood Co., Chas. N.

Commutators or Parts
Columbia Machine Works & M. I. Co.
General Electric Co.
Westinghouse E. & M. Co.

Compounds, Insulating
Johns-Manville Corp.

Compressors, Air
General Electric Co.
Westinghouse Tr. Br. Co.

Condensers
General Electric Co.
Westinghouse E. & M. Co.

Condensor Papers
Irvington Varnish & Ins. Co.

Conduits, Fibre
Fibre Conduit Co.
Johns-Manville Corp.

Conduit Duct, Underfloor
Johns-Manville Corp.

Connectors, Solderless
Westinghouse E. & M. Co.

Connectors, Trailer Car
Columbia Machine Works
Consolidated Car Heating Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Controllers or Parts
Columbia Machine Works & M. I. Co.
General Electric Co.
Westinghouse E. & M. Co.

Controller Regulators
Elec. Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse E. & M. Co.

Converters, Rotary
General Electric Co.
Westinghouse E. & M. Co.

Conveying & Hoisting Machinery
American Bridge Co.

Copper Wire
American Brass Co
American Steel & Wire Co.
Anaconda Copper Mining Co.

Copper Wire Instruments, Measuring, Testing and Recording
American Brass Co.
Anaconda Copper Mining Co.

Cord, Bell, Trolley, Register
American Steel & Wire Co.
Brill Co., The J. G.
Elec. Service Supplies Co.
International Register Co.
Roebling's Sons Co., John A.
St. Louis Car Co.
Samson Cordage Works
Silver Lake Co.

Cord Connectors and Couplers
Elec. Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
American Steel Foundries
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
Ohio Brass Co.
Westinghouse Traction Brake Co.

Cowl Ventilators
Nichols-Lintern Co.

Cranes, Hoists & Lifts
Electric Service Supplies Co.

Cross Arms (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossings
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Frogs & Switches
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Track (See Track Special Work)

Crossings, Trolley
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Curtains & Curtain Fixtures
Brill Co., The J. G.
Edwards Co., Inc., & M.
St. Louis Car Co.

Cutting Apparatus
Electric Railway Improvement
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse Electrical & Mfg. Co.

Dealer's Machinery & Second Hand Equipment
Electric Equipment Co.

Derailing Devices (See also Track Work)

Derailing Switches
Ramapo Ajax Corp.

Destination Signs
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.

Detective Service
Wish-Service, P. Edward

Door Operating Devices
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Heating Co.
National Pneumatic Co.

Doors & Door Fixtures
Brill Co., The J. G.
Cincinnati Car Co.
Edwards Co., Inc., & M.
Hale-Kilburn Co.
St. Louis Car Co.

Doors, Folding Vestibule
National Pneumatic Co.

Drills, Track
American Steel & Wire Co.
Electric Service Supplies Co.
Ohio Brass Co.

Dryers, Sand
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Ears
Columbia Machine Works & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Electric Grinders
Railway Trackwork Co.

Electric Rivet Heaters
American Car & Fdry. Co.

Electric Transmission Towers
American Bridge Co.

Electrical Wires and Cables
Amer. Electrical Works.
American Steel & Wire Co.
John A. Roebling's Sons Co.

Electrodes, Carbon
Railway Trackwork Co.
Una Welding & Bonding Co.

Electrodes, Steel
Railway Trackwork Co.
Una Welding & Bonding Co.

Enamel
Du Pont de Nemours & Co., E. I.

Engineers, Consulting, Contracting and Operating
Beeler, John A.
Byllesby Co., H. M.
Day & Zimmermann, Inc.
Falle & Co., E. H.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & DeLeuw
Linn & Marshall Co.
McClellan & Junkersfeld
Richey, Albert S.
Sanderson & Porter
Stevens & Wood
Stone & Webster Co.
White Eng. Corp., The J. G

Engines, Gas, Oil or Steam
Westinghouse E. & M. Co

Exterior Side Panels
Haskelite Mfg. Corp.

Fare Boxes
Cleveland Fare Box Co.
Johnson Fare Box Co.
Ohmer Fare Register Co.
Perey Mfg. Co.

Fare Registers
Electric Service Supplies Co.
Johnson Fare Box Co.
Ohmer Fare Register Co.

Fences, Woven Wire & Fence Posts
American Steel & Wire Co

Fenders and Wheel Guards
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Fender Co
St. Louis Car Co.
Star Brass Works
Wood Co., Chas. N.

Fibre and Fibre Tubing
Westinghouse E. & M. Co.

Field Coils (See Coils)

Floodlights
Electric Service Supplies Co
General Electric Co.

Floor, Sub
Haskelite Mfg. Corp.

Flooring, Monolithic
Johns-Manville Corp.

Flooring, Fireproof
Irving Iron Works

Flooring, Non Slipping
Irving Iron Works

Flooring, Open Steel
Irving Iron Works

Flooring, Steel, Subway
Irving Iron Works

Flooring, Ventilating
Irving Iron Works

Floors
Haskelite Mfg. Corp.

Forgings
Brill Co., The J. G.
Cincinnati Car Co.
Standard Steel Works

Frogs & Crossings, Tee Rail
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Frogs, Track (See Track Work)

Frogs, Trolley
Electric Service Supplies Co
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M Co.

Furnaces, Electric Steel Melting
American Bridge Co.

Fuses and Fuse Boxes
Columbia Machine Works & M. I. Co.

AMERICAN BRIDGE COMPANY

EMPIRE BUILDING—71 BROADWAY NEW YORK, N. Y.

Manufacturers of Steel Structures of all classes particularly BRIDGES AND BUILDINGS

ALSO STEEL BARGES FOR HARBORS AND RIVERS, STEEL TOWERS FOR ELECTRIC TRANSMISSION, HEROULT ELECTRIC FURNACES, ETC.

SALES OFFICES:

NEW YORK, N.Y. Philadelphia, Pa. Boston, Mass. Baltimore, Md.
PITTSBURGH, PA. Cincinnati, Ohio Cleveland, Ohio Detroit, Mich.
CHICAGO, ILL. St. Louis, Mo. Denver, Colo. Salt Lake City, Utah Duluth, Minn. Minneapolis, Minn.
Pacific Coast Representative: U. S. Steel Products Co., Pacific Coast Dept. San Francisco, Cal. Los Angeles, Cal. Portland, Ore. Seattle, Wash.

Export Representative: United States Steel Products Co., 30 Church Street, New York.

Lorain Special Trackwork Girder Rails

Electrically Welded Joints

THE LORAIN STEEL COMPANY

Johnstown, Pa.

Sales Offices:

Atlanta Chicago Cleveland New York Philadelphia Pittsburgh Dallas

Pacific Coast Representotive:
United States Steel Products Company
Los Angeles Portland San Francisco Seattle

Export Representative:
United States Steel Products Company, New York, N. Y.

TISCO MANGANESE STEEL SPECIAL TRACKWORK

Wharton *Tisco* Manganese Steel Trackwork will help you hold the up-keep down.

WM. WHARTON JR. & CO., INC.
Easton, Penna.

Kalamazoo Trolley Wheels

The value of Kalamazoo Trolley Wheels and Harps has been demonstrated by large and small electric railway systems for a period of thirty years. Being exclusive manufacturers, with no other lines to maintain, it is through the high quality of our product that we merit the large patronage we now enjoy. With the assurance that you pay no premium for quality we will appreciate your inquiries.



THE STAR BRASS WORKS
KALAMAZOO, MICH., U. S. A.

B. A. HEGEMAN, Jr., President H. A. HEGEMAN, First Vice-Pres. and Treas.
F. T. SARGENT, Secretary W. C. PETERS, Vice-Pres. Sales and Engineering

National Railway Appliance Co.

Graybar Building, 420 Lexington Ave., New York

BRANCH OFFICES

Munsey Bldg., Washington, D. C. 100 Boylston St., Boston, Mass.
Hegeman-Castle Corporation, Railway Exchange Building, Chicago, Ill.

RAILWAY SUPPLIES

Tool Steel Gears and Pinions
Anglo-American Varnish Co., Varnishes, Enamels, etc.
National Hand Holds
Genesco Paint Oils
Dunham Hopper Door Device
Garland Ventilators
Walter Tractor Snow Plows
Feasible Drop Brake Staffs
Ft. Pitt Spring & Mfg. Co., Springs
Flaxlinum Insulation
Anderson Slack Adjusters
Economy Electric Devices Co. Power Saving and Inspection Meters
"Topeseald" Lamps
Bus Lighting Equipment
Cowdry Automotive Brake Testing Machine

AMERICAN ELECTRICAL WORKS — AMELECTRIC — Wires and Cables — PHILLIPSDALE, R.I.

Reg. U. S. Pat. Office

AMELECTRIC PRODUCTS

BARE COPPER WIRE AND CABLE

TROLLEY WIRE

WEATHERPROOF WIRE AND CABLE

PAPER INSULATED UNDERGROUND CABLE

MAGNET WIRE

AMERICAN ELECTRICAL WORKS
PHILLIPSDALE, R. I.

Chicago, 20-32 West Randolph Street.
Cincinnati, Traction Bldg.: New York, 100 E. 42nd St.

Bethlehem Products for Electric Railways

Tee and Girder Rails; Machine Fitted Joints; Splice Bars; Hard Center Frogs; Hard Center Mates; Rolled Alloy Steel Crossings; Abbott and Center Rib Base Plates; Rolled Steel Wheels and Forged Axles; Tie Rods; Bolts; Tie Plates and Pole Line Material.

Catalog Sent on Request

BETHLEHEM STEEL COMPANY, Bethlehem, Pa.

BETHLEHEM

Consolidated Car Heating Co.
General Electric Co.
Westinghouse E. & M. Co.

Gas Electric Drive for Buses
General Electric Co.

Gaskets
Westinghouse Tr. Br. Co.

Gaskets, Asbestos
Johns-Manville Corp.

Gas Producers
Westinghouse E. & M. Co

Gates, Car
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.

Gear Blanks
Brill Co., The J. G.
Standard Steel Works

Gear Cases
Chillingworth Mfg. Co.
Columbia Machine Works & M. I. Co.
Electric Service Supplies Co
Westinghouse E. & M. Co.

Gears and Pinions
Bemis Car Truck Co.
Columbia Machine Works & M. I. Co.
Electric Service Supplies Co
General Electric Co.
Nat'l Ry. Appliance Co.
Tool Steel Gear & Pinion Co.

Generators
General Electric Co.
Westinghouse E. & M. Co.

Girder Rails
Bethlehem Steel Co.
Lorain Steel Co.

Gongs (See Bells and Gongs)

Grating, Steel Subway
Irving Iron Works

Greases (See Lubricants)

Grinders, Portable
Railway Trackwork Co.

Grinders, Portable Electric
Railway Trackwork Co.

Grinding Bricks and Wheels
Railway Trackwork Co.

Guard Rail Clamps
Ramapo Ajax Corp.

Guard Rails, Tee Rail & Manganese
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Guards, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.

Harps, Trolley
Columbia Machine Works
Elec. Service Supplies Co.
Star Brass Works

Headlights
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

Headlining
Columbia Machine Works & M. I. Co.
Haskelite Mfg. Corp.

Heaters, Bus
Nichols-Lintern Co.

Heaters, Car (Electric)
Consolidated Car Heating Co.
Gold Car Heat. & Ltg. Co.
Railway Utility Co.
Smith Heater Co., Peter

Heaters, Car, Hot Air and Water
Smith Heater Co., Peter

Heaters, Car Stove
Smith Heater Co., Peter

Heaters, Electric Rivet
American Car & Fdry. Co.

Helmets, Welding
Railway Trackwork Co.
Una Welding & Bonding Co.

Hoists & Lifts
Columbia Machine Works & M. I. Co.

Hose, Bridges
Ohio Brass Co.

Hose, Pneumatic
Westinghouse Traction Brake Co.

Instruments, Measuring, Testing and Recording
American Steel & Wire Co.
General Electric Co.
National Ry. Appliance Co.
Westinghouse E. & M. Co.

Insulating Cloth, Paper and Tape
General Electric Co.
Irvington Varnish & Ins. Co.
Okonite Co.
Okonite-Callender Cable Co.
Westinghouse E. & M. Co.

Insulating Silk
Irvington Varnish & Ins. Co.

Insulating Varnishes
Irvington Varnish & Ins. Co.

Hose, Pneumatic
Westinghouse Traction Brake Co.

Insulation (See also Paints)
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
Irvington Varnish & Ins. Co.
Okonite Co.
Okonite-Callender Cable Co.
Westinghouse E. & M. Co.

Insulation, Paper & Boiler
Johns-Manville Corp.

Insulation Slots
Irvington Varnish & Ins. Co.

Insulator Pins
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Insulators (See also Line Materials)
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Interior Side Linings
Haskelite Mfg. Corp.

Jacks (See also Cranes, Hoists and Lifts)
Blackhawk Mfg. Co.
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.

Joints, Rail
(See Rail Joints)

Journal Boxes
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.

Lacquer Finishes
Du Pont de Nemours & Co., E. I.

Lamp Guards and Fixtures
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

Lamps, Arc & Incandescent (See also Headlights)
General Electric Co.
Westinghouse E. & M. Co.

Lamps, Signal and Marker
Elec. Service Supplies Co.
Nichols-Lintern Co.

Lanterns, Classification
Nichols-Lintern Co.

Letter Boards
Cincinnati Car Co.
Haskelite Mfg. Corp.

Lighting Fixtures, Interior
Electric Service Supplies Co.

Lightning Protection
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Line Material (See also Brackets, Insulators, Wires, etc.)
Archbold-Brady Co.
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Locking Spring Boxes
Wm. Wharton, Jr. & Co.

Locomotives, Electric
Cincinnati Car Co.
Cummings Car & Coach Co.
General Electric Co.
St. Louis Car Co.
Westinghouse E. & M. Co.

Lubricating Engineers
Universal Lubricating Co.

Lubricants, Oil and Grease
Universal Lubricating Co.

Manganese Parts
Bemis Car Truck Co.

Manganese Steel Guard Rails
Ramapo Ajax Corp.
Wm. Wharton Jr. & Co.

Manganese Steel, Special Track Work
Bethlehem Steel Co.
Wm. Wharton, Jr. & Co.

Manganese Steel Switches, Frogs and Crossings
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Meters (See Instruments)

Mirrors, Inside & Outside
Cincinnati Car Co.

Motor Buses (See Buses)

Motors, Electric
General Electric Co.
Westinghouse E. & M. Co.

Motor, Generators & Controls for Electric Buses
General Electric Co.

Motorman's Seats
Brill Co., The J. G.
Cincinnati Car Co.
Elec. Service Supplies Co.
Heywood Wakefield Co.
St. Louis Car Co.
Wood Co., Chas. N.

Nuts and Bolts
Bemis Car Truck Co.
Cincinnati Car Co.
Hubbard & Co.

Oils (See Lubricants)

Omnibuses (See Buses)

Oxy-Acetylene (See Cutting Apparatus)

Packing
Westinghouse Traction Brake Co.

Packing, Asbestos
Johns-Manville Corp.

Paint
Du Pont de Nemours & Co., E. I.

Paint, Iron Preservation
Johns-Manville Corp.

Paints and Varnishes (Insulating)
Elec. Service Supplies Co.
Irvington Varnish & Ins. Co.

Paints & Varnishes, Railway
National Ry. Appliance Co.

Panels, Outside, Inside
Haskelite Mfg. Corp.

Pickup, Trolley Wire
Elec. Service Supplies Co.
Ohio Brass Co.

Pinion Pullers
Elec. Service Supplies Co.
Wood Co., Chas. N.

Pinions (See Gears)

Pins, Case Hardened, Wood and Iron
Ohio Brass Co.
Westinghouse Traction Brake Co.

Pipe Fittings
Standard Steel Works
Westinghouse Tr. Brake Co.

Planers (See Machine Tools)

Plates for Tee Rail Switches
Ramapo Ajax Corp.

Pliers, Rubber Insulated
Elec. Service Supplies Co.

Plywood Roofs, Headlinings, Floors, Interior Panels, Bulkheads, Truss Planks
Haskelite Mfg. Corp.

Pole Line Hardware
Bethlehem Steel Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.

Pole Reinforcing
Hubbard & Co.

Poles, Metal Street
Batea Expanded Steel Truss Co.
Elec. Ry. Equipment Co.
Hubbard & Co.

Poles, Ties, Posts, Piling & Lumber
American Creosoting Co.
Nangle Pole & Tie Co.
J. F. Prettyman & Son

Poles and Ties, Treated
American Creosoting Co.
J. F. Prettyman & Son

Poles, Trolley
Elec. Service Supplies Co.

Poles, Tubular Steel
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.

Portable Grinders
Railway Trackwork Co.

Potheads
Okonite Co.
Okonite-Callender Cable Co., Inc.

Power Houses
American Bridge Co.

Power Saving Devices
National Ry. Appliance Co.

Pressings, Special Steel
Cincinnati Car Co.

Pressure Regulators
General Electric Co.
Westinghouse E. & M. Co.
Westinghouse Traction Brake Co.

Punches, Ticket
International Register Co.
Wood Co., Chas. N.

Pyroxylin
Du Pont de Nemours & Co., E. I.

Radiators
Long Mfg. Co.

Rail Braces and Fastenings
Ramapo Ajax Corp.

Rail Grinders (See Grinders)

Rail Joints
Carnegie Steel Co.
Illinois Steel Co.
Rail Joint Co.

Rail Joints, Welded
Lorain Steel Co.

Rail Welding
Railway Trackwork Co.
Una Welding & Bonding Co.

Rails, Steel
Carnegie Steel Co.
Illinois Steel Co.

Railway Safety Switches
Consolidated Car Heating Co.
Westinghouse E. & M. Co.

Rattan
Brill Co., The J. G.
Cummings Car & Coach Co.
Elec. Service Supplies Co.
Hale-Kilburn Co.
Heywood Wakefield Co.
St. Louis Car Co.

Registers and Fittings
Brill Co., The J. G.
Cincinnati Car Co.
Elec. Service Supplies Co.
International Register Co.
Ohmer Fare Register Co.
St. Louis Car Co.

Reinforcement, Concrete
American Steel & Wire Co.
Bethlehem Steel Co.
Carnegie Steel Co.

Repair Shop Appliances (See also Coil Banding and Winding Machines)
Elec. Service Supplies Co.

Repair Work (See also Coils)
Westinghouse E. & M. Co.

Replacers, Car
Cincinnati Car Co.
Elec. Service Supplies Co.

Resistances
Consolidated Car Heating Co.
General Electric Co.

Resistance, Wire and Tube
Westinghouse E. & M. Co.

Retrievers, Trolley (See Catchers and Retrievers Trolley)

Rheostats
General Electric Co.
Westinghouse E. & M. Co.

Rivet Heaters, Electric
American Car & Fdry. Co.

Roofing, Asbestos (Corrugated & Flat)
Johns-Manville Corp.

Roofing, Car
Haskelite Mfg. Corp.

Roofing & Shingle, Asbestos
Johns-Manville Corp.

Roofs, Car and Bus
Haskelite Mfg. Corp.

Sanders, Track
Brill Co., The J. G.
Elec. Service Supplies Co.
Nichols-Lintern Co.
Ohio Brass Co.
St. Louis Car Co.

Sash Fixtures, Car
Brill Co., The J. G.
Cincinnati Car Co.
Edwards Co., Inc., O. M.
St. Louis Car Co.

Sash, Metal Car Window
Edwards Co., Inc., O. M.
Hale-Kilburn Co.

Scrapers, Track (See Cleaners and Scrapers, Track)

Screw Drivers, Rubber Insulated
Elec. Service Supplies Co.

Seating Materials
Brill Co., The J. G.
Haskelite Mfg. Corp.
Heywood Wakefield Co.
Massachusetts Mohair Plush Co.
St. Louis Car Co.

Seats, Bus
Brill Co., The J. G.
Hale-Kilburn Co.
Heywood Wakefield Co.
St. Louis Car Co.

Seats, Car (See also Rattan)
Brill Co., The J. G.
Cincinnati Car Co.
Hale-Kilburn Co.
Heywood Wakefield Co.
St. Louis Car Co.

Second Hand Equipment
Electric Equipment Co.

Shades, Vestibule
Brill Co., The J. G.
Cincinnati Car Co.

Shock Absorbers
Cleveland Pneumatic Tool Co.

Shop Tools
Blackhawk Mfg. Co.

Shovels
Brill Co., The J. G.
Hubbard & Co.

Shovels, Power
Brill Co., The J. G.

Side Bearings (See Bearings Center and Side)

Signals, Car Starting
Consolidated Car Heating Co.
Elec. Service Supplies Co.
National Pneumatic Co.

Signals, Indicating
Nichols-Lintern Co.

Signal Systems, Block
Elec. Service Supplies Co.
Nachod and United States Electric Signal Co.
Wood Co., Chas. N.

Signal Systems, Highway Crossing
Nachod and United States Electric Signal Co.
Wood Co., Chas. N.

Slack Adjusters (See Brake Adjusters)

Sleet Wheels and Cutters
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.

Smokestacks, Car
Nichols-Lintern Co.

Snow Plows
National Ry. Appliance Co.

Snow-Plows, Sweepers and Brooms
Brill Co., The J. G.
Columbia Machine Works & M. I. Co.
Consolidated Car Fender Co.
Cummings Car & Coach Co.
St. Louis Car Co.

Snow Sweeper, Rattan
J. G. Brill Co.
Heywood Wakefield Co.

Soldering and Brazing Apparatus (See Welding Processes and Apparatus)

Special Adhesive Papers
Irvington Varnish & Ins. Co.

Special Trackwork
Bethlehem Steel Co.
Lorain Steel Co.
Wm. Wharton, Jr. & Co.

Spikes
American Steel & Wire Co.
Illinois Steel Co.

Splicing Compounds
Westinghouse E. & M. Co.

Splicing Sleeves (See Clamps and Connectors)

Springs
National Ry. Appliance Co.

Springs, Car and Truck
American Spiral Spring Co.
American Steel Foundries
American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
Standard Steel Works

Sprinklers, Track and Road
Brill Co., The J. G.
Cummings Car & Coach Co.
St. Louis Car Co.

Stair Steps, Safety
Irving Iron Works

Steel and Steel Products
American Steel & Wire Co.
Carnegie Steel Co.
Illinois Steel Co.

Steps, Car
Brill Co., The J. G.
Cincinnati Car Co.
Irving Iron Works

Stokers, Mechanical
Babcock & Wilcox Co.
Westinghouse E. & M. Co.

Stop Signals
Nichols-Lintern Co.

Storage Batteries (See Batteries, Storage)

Strain Insulators
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Strand
American Steel & Wire Co.
Roebling's Sons Co., J. A.

Street Cars (See Cars, Passenger, Freight, Express)
Cummings Car & Coach Co.

Superheaters
Babcock & Wilcox Co.

Sweepers, Snow (See Snow Plows, Sweepers and Brooms)

Switches
General Electric Co.

Switch Stands and Fixtures
Ramapo-Ajax Corp.

Switchboards, Asbestos
Johns-Manville Corp.

Switches, Selector
Nichols-Lintern Co.

Switches and Switchboards
Consolidated Car Heating Co.
Elec. Service Supplies Co.
Westinghouse E. & M. Co

Switches, Tee Rail
Ramapo-Ajax Corp.

Switches, Track (See Track Special Work

Tampers, Tie
Railway Trackwork Co.

Tapes and Cloths (See Insulating Cloth, Paper and Tape)

Tee Rail Special Track Work
Ramapo-Ajax Corp.

Telephones and Parts
Elec. Service Supplies Co

Telephone & Telegraph Wire
American Steel & Wire Co
American Telephone & Telegraph Co.
John A. Roeblings Sons Co.

Arc Weld Rail Bonds

AND ALL OTHER TYPES

Descriptive Catalogue Furnished

American Steel & Wire Company

New York Chicago Boston Cleveland Pittsburgh Denver

U. S. Steel Products Co.

San Francisco Los Angeles Portland Seattle

"The Standard for Rubber Insulation"

INSULATED WIRES and CABLES

"Okonite," "Manson," and Dundee "A" "B" Tapes

Send for Handbook

The Okonite Company

The Okonite-Callender Cable Company, Inc.

Factories, PASSAIC, N. J. PATERSON, N. J.

Sales Offices: New York Chicago Pittsburgh St. Louis Atlanta Birmingham San Francisco Los Angeles Seattle

Pettingell-Andrews Co., Boston, Mass.

F. D. Lawrence Electric Co., Cincinnati, O.

Novelty Electric Co., Phila., Pa.

Gen. Rep.: Engineering Materials Limited, Montreal.

Cuban Rep.: Victor G. Mendoza Co., Havana.

Waterproofed Trolley Cord



Is the finest cord that science and skill can produce Its wearing qualities are unsurpassed.

FOR POSITIVE SATISFACTION ORDER SILVER LAKE

If you are not familiar with the quality you will be surprised at its ENDURANCE and ECONOMY.

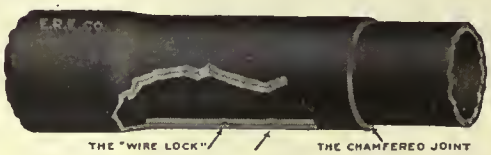
Sold by Net Weights and Full Lengths

SILVER LAKE COMPANY

Manufacturers of bell, signal and other cords.

Newtonville, Massachusetts

ELRECO TUBULAR POLES



COMBINE

Lowest Cost Lightest Weight

Least Maintenance Greatest Adaptability

Catalog complete with engineering data sent on request.

ELECTRIC RAILWAY EQUIPMENT CO.

CINCINNATI, OHIO

New York City, 30 Church Street

ANACONDA from mine to consumer

Rod, Wire and Cable Products

ANACONDA COPPER MINING COMPANY

THE AMERICAN BRASS COMPANY

General Offices - - 25 Broadway, New York

ANACONDA TROLLEY WIRE

THE WORLD'S STANDARD

"IRVINGTON"

Black and Yellow

Varnished Silk, Varnished Cambric, Varnished Paper

Irv-O-Slot Insulation Flexible Varnished Tubing

Insulating Varnishes and Compounds

Irvington Varnish & Insulator Co.

Irvington, N. J.

Sales Representatives:

Mitchell-Rand Mfg. Co., N. Y. Prehler Brothers Inc., Chicago

E. M. Wolcott, Rochester White Supply Co., St. Louis

I. W. Levine, Montreal Clapp & LaMoree, Los Angeles

A. L. Gillies, Toronto Martin Woodard, Seattle

Consumers' Rubber Co., Cleveland

Efficient Bus Heating

with

The N-L Venti-Duct Heater

THE NICHOLS-LINTERN CO.

7960 Lorain Ave. Cleveland, Ohio

NAUGLE POLES

WESTERN & NORTHERN CEDAR

NAUGLE POLE & TIE CO.

59 E. MADISON ST. CHICAGO ILL.

New York · Columbus · Kansas City · Spokane · Vancouver · Boston

ELECTRICAL WIRES and CABLES

ROEBLING

John A. Roebling's Sons Co., Trenton, N. J.

SAMSON SPOT WATERPROOFED TROLLEY CORD



Trade Mark Reg. U. S. Pat. Off.

Made of extra quality stock firmly braided and smoothly finished
Carefully inspected and guaranteed free from flaws.
Samples and information gladly sent.

SAMSON CORDAGE WORKS, BOSTON, MASS.



Gets Every Fare

PEREY TURNSTILES or PASSIMETERS

Use them in your Prepayment Areas and Street Cars

Perey Manufacturing Co., Inc.

101 Park Avenue, New York City

The DIFFERENTIAL CAR



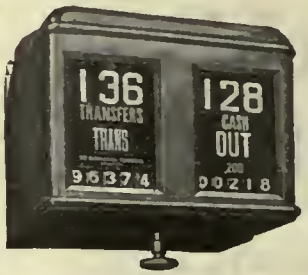
Standard on 60 Railways for

Track Maintenance
Track Construction
Ash Disposal
Coal Hauling
Concrete Materials
Waste Handling
Excavated Materials
Hauling Cross Ties
Snow Disposal

Use These Labor Savers

Differential Crane Car
Clark Concrete Breaker
Differential 3-way Auto Truck Body
Differential Car Wheel Truck and Tractor

THE DIFFERENTIAL STEEL CAR CO., Findlay, O.



Type R-11
Double Register

International Registers

Made in single and double types to meet requirements of service. For hand or foot, mechanical or electric operation. Counters, car fittings, conductors' punches.

The International Register Co.
15 South Throop Street, Chicago, Illinois



"Bates Poles Outlive the Bond Issues that Buy Them"
BATES POLES AND STRUCTURES
Bates Expanded Steel Truss Co.
General Offices and Plants
EAST CHICAGO, INDIANA, U. S. A.

NACHOD & UNITED STATES SIGNAL CO., INC.

LOUISVILLE, KY.

BLOCK SIGNALS
FOR
ELECTRIC RAILWAYS
HIGHWAY CROSSING SIGNALS



RAILWAY UTILITY COMPANY

CAR COMFORT WITH UTILITY

HEATERS
REGULATORS
VENTILATORS

2241-2247 Indiana St.
Chicago, Ill.

Write for Catalogue

1328 Broadway
New York, N. Y

GOLD CAR HEATING & LIGHTING CO.

220 36th St., Brooklyn, N. Y.

ELECTRIC HEATERS WITH OPEN COIL OR ENCLOSED ELEMENTS
THERMOSTAT CONTROL—VENTILATORS
WRITE FOR NEW CATALOGUE





STUCKI SIDE BEARINGS

A. STUCKI CO.
Oliver Bldg.
Pittsburgh, Pa.

H B LIFE GUARDS

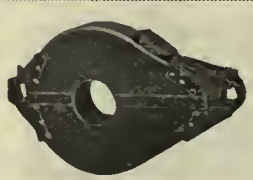
PROVIDENCE FENDERS

Manufactured by
CONSOLIDATED CAR FENDER CO., PROVIDENCE, R. I.
General Sales Agents
WENDELL & MacDUFFIE CO., 110 E. 42nd St., N. Y. C.

HASKELITE ROOFS

Haskelite Manufacturing Corporation,
133 West Washington Street, Chicago

PLYMETL SIDE PANELS



CHILLINGWORTH

One-Piece Gear Cases

Seamless—Rivetless—Light Weight Best for Service — Durability and Economy. *Write Us.*

Chillingworth Mfg. Co.
Jersey City, N. J.

Chapman Automatic Signals

Charles N. Wood Co., Boston



Coin Counting and Sorting Machines

FARE BOXES

Lever-Operated and Slip Change Carriers

The Cleveland Fare Box Co.
Cleveland, Ohio
Canadian Cleveland Fare Box Co., Ltd., Preston, Ont.

ALPHABETICAL INDEX TO ADVERTISEMENTS

Page

A

American Brass Co., The..... 41
American Bridge Co..... 39
American Car Co.....44-45
American Creosoting Co..... 31
American Electrical Works.... 39
American Steel & Wire Co..... 41
American Steel Foundries 4
American Telephone & Telegraph Co. 24
Anaconda Copper Mining Co.... 41

B

Babcock & Wilcox Co..... 35
Bates Expanded Steel Truss Co. 42
Beeler Organization 34
Bemis Car Truck Co..... 35
Bethlehem Steel Co..... 39
Blackhawk Mfg. Co..... 25
Brill Co., The J. G.....44-45
Buchanan & Layng Corp..... 34
Byllesby Eng. & Management Corp. 35

C

Carnegie Steel Co..... 33
Chillingworth Mfg. Co..... 42
Cincinnati Car Co.....12-13
Cleveland Fare Box Co..... 42
Cleveland Pneumatic Tool Co., The 22
Collier, Inc., Barron G..... 26
Columbia Machine Works, The.. 33
Consolidated Car Fender Co.... 42
Consolidated Car Heating Co... 42

D

Day & Zimmermann, Inc..... 34
Differential Steel Car Co., The.. 42
Du Pont de Nemours & Co., Inc., E. I. 21

Page

E

Edwards Co., D. M..... 10
Electric Equipment Co..... 37
Electric Ry. Equipment Co.... 41
Electric Service Supplies Co.... 9

F

Faile & Co., E. H..... 34
Ford, Bacon & Davis..... 34
"For Sale" Ads..... 37

G

General Electric Co.....16-17-18
Globe Ticket Co..... 14
Gold Car Heating & Lighting Co. 42
Goodyear Tire & Rubber Co., The. 20

H

Hale-Kilburn Co..... 35
Haskelite Mfg. Corp..... 42
"Help Wanted" Ads..... 37
Hemphill & Wells 34
Heywood-Wakefield Co..... 15
Holst Englehardt W..... 34
Hubbard & Co..... 35

I

Illinois Steel Co..... 8
International Motor Co. Front Cover
International Register Co..... 42
International Steel Tie Co., The. 7
Irving Iron Works..... 30
Irvington Varnish & Insulator Co. 41

J

Jackson, Walter 34
Jeandron, W. J..... 36
Johnson Fare Box Co..... 36
Johns-Manville Corp. 12

Page

K

Kelker, DeLeuw & Co..... 34
Kuhlman Car Co.....44-45

L

LeCarbone Co..... 36
Linn & Marshall, Inc..... 34
Long Mfg. Co., The..... 23
Lorain Steel Co..... 39

M

McClellan & Junkersfeld 34
McGraw-Hill Book Co..... 32
Mack Trucks, Inc.....Front Cover
Massachusetts Mohair Plush Co. 27
Morganite Brush Co..... 30

N

Nachod and U. S. Signal Co.... 42
National Brake Co., Inc..... 19
National Pneumatic Co..... 11
National Ry. Appliance Co..... 39
Naugle Pole & Tie Co..... 41
Nichols Lintern Co..... 41
Norma-Hoffmann Bearings Corp. 33

O

Oakite Products, Inc..... 32
Ohio Brass Co..... 5
Ohmer Fare Register Co..... 32
Okonite-Callender Cable Company, Inc., The..... 41
Okonite Co., The..... 41

P

Perey Mfg. Co., Inc..... 41
Positions Wanted and Vacant... 37
Prettyman & Sons, J. F..... 36

Page

R

Railway Track-work Co..... 35
Railway Utility Co..... 42
Ramapo Ajax Corp..... 42
Richey, Albert 34
Roebling's Sons Co., John A.... 41

S

Samson Cordage Works..... 41
Sanderson & Porter..... 34
Searchlight Section 37
Silver Lake Co..... 41
Smith Heater Co., Peter..... 35
Standard Steel Works Co..... 36
Star Brass Works..... 39
Stevens & Wood, Inc..... 34
Stone & Webster..... 34
Stucki Co., A..... 42

T

Timken-Detroit Axle Co., The, Back Cover

U

Una Welding & Bonding Co.... 35
Universal Lubricating Co..... 35

W

"Want" Ads 37
Wason Mfg. Co.....44-45
Westinghouse Electric & Mfg. Co. 2
Westinghouse Traction Brake Co. 6
Wharton, Jr. & Co., Inc., Wm. 39
"What and Where to Buy," 38-40-43
White Eng. Corp., The J. G.... 34
Wiah Service, The P. Edw.... 35
Wood Co., Chas. N..... ... 42

WHAT AND WHERE TO BUY—Continued from page 40

Testing Instruments (See Instruments, Measuring, Testing, etc.)

Thermostats
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter

Ticket Choppers and Destroyers
Elec. Service Supplies Co

Tickets and Transfers
Globe Ticket Co.

Tie Plates
Illinois Steel Co.

Ties and Tie Rods, Steel
American Bridge Co.
Carnegie Steel Co.
International Steel Tie Co.

Ties, Wood Cross (See Poles, Ties, Posts, etc.)

Tires
Goodyear Tire Co.

Tokens
Johnson Fare Box Co.

Tongue Switches
Wm. Wharton, Jr. & Co.

Tools, Track & Miscellaneous
American Steel & Wire Co
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
Hubbard & Co.
Railway Trackwork Co.
Ramapo-Ajax Corp.

Towers and Transmission Structure
American Bridge Co.
Bates Expanded Steel Truss Co.
Westinghouse E. & M. Co.

Track Grinder
Railway Trackwork Co.
Ramapo-Ajax Corp.

Track, Special Work
Columbia Machine Works & M. I. Co.
Ramapo Ajax Corp.

Trackless Trolley Cars
Brill Co., The J. G.
St. Louis Car Co.

Transfer Issuing Machines
Ohmer Fare Register Co.

Transfer Tables
American Bridge Co.

Transformers
General Electric Co.
Westinghouse E. & M. Co.

Traps, Steam & Radiator Control Valves, Radiators
Johns-Manville Corp.

Treads, Safety Stair, Car Step
Cincinnati Car Co.
Irving Iron Works

Tree Wire
Okonite Co.
Okonite-Callender Cable Co

Trolley Bases
Ohio Brass Co.

Trolley Buses, Retrieving
Ohio Brass Co.

Trolley Buses
Brill Co., The J. G.
Westinghouse E. & M. Co

Trolley Material, Overhead
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Trolley Wheel Bushings
Star Brass Works

Trolley Wheels (See Wheels, Trolley)

Trolley Wire
Amer. Electrical Works
American Brass Co.
American Steel & Wire Co
Anaconda Copper Min. Co.
Roebling's Sons Co., J. A

Trucks, Car
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Cummings Car & Coach Co.
St. Louis Car Co.

Trucks, Motor
White Company

Truss Planks
Haskelite Mfg. Corp.

Tubing, Yellow and Black Flexible Varnish
Irvington Varnish & Ins.

Turbines, Steam
General Electric Co.
Westinghouse E. & M. Co.

Turntables
American Bridge Co.
Elec. Service Supplies Co.

Turnstiles
Elec. Service Supplies Co.
Perey Mfg. Co., Inc.

Valves
Ohio Brass Co.
Westinghouse Tr. Br. Co

Varnished Papers and Silks
Irvington Varnish & Ins. Co.

Ventilators, Car
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Heating Co.
Nichols-Lintern Co.
Nat'l. Ry. Appliance Co
Railway Utility Co.
St. Louis Car Co.

Vestibule Linings
Haskelite Mfg. Corp.

Waterproofing
Johns-Manville Corp.

Welded Rail Joints
Railway Trackwork Co.
Una Welding & Bonding Co

Welders, Portable Electric
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Welders, Rail Joint
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.

Welding Processes and Apparatus
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Welding, Steel
Railway Trackwork Co.
Una Welding & Bonding Co

Welding Wire
American Steel & Wire Co.
Railway Trackwork Co.
Roebling's Sons Co., J. A.

Welding Wire and Rods
Railway Trackwork Co.

Wheel Guards (See Fenders and Wheel Guards)

Wheel Presses (See Machine Tools)

Wheels, Car, Steel & Steel Tire
American Steel Foundries
Bemis Car Truck Co.
Carnegie Steel Co.
Illinois Steel Co.
Standard Steel Works

Wheels, Trolley
Columbia Machine Works & M. I. Co.
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Star Brass Works

Wheels, Wrought Steel
Carnegie Steel Co.
Illinois Steel Co.

Whistles, Air
Ohio Brass Co.
Westinghouse E. & M. Co.
Westinghouse Traction Brake Co.

Window Guards & Fittings
Cincinnati Car Co.

Wire Rope
American Steel & Wire Co.
Roebling's Sons Co., J. A.

Wires and Cables
American Brass Co.
American Electrical Works
American Steel & Wire Co.
Anaconda Copper Min. Co.
General Electric Co.
Okonite Co.
Okonite-Callender Cable Co. Inc.
Roebling's Sons Co., J. A.
Westinghouse E. & M. Co.

Wood Preservatives
American Creosoting Co.

Stimulating the desire to ride—



From the sidewalk

To prospective passengers on the sidewalk the Brill 1928 Model Electric Car offers an attractively designed vehicle, unusually low floor height which makes loading and unloading easier, and wide, full vision side windows to make the ride pleasant and interesting.

And, as it gets under way, its smooth and quick acceleration and the absence of disturbing noises, due to the use of W-N double reduction gear drive, as well as external contracting shoe type drum brakes and reduction in unsprung weight, makes a most favorable impression.

The Brill 1928 Model Electric Car introduces a new era in street car design. It stimulates the desire to ride.

BRILL 1928 Model

Stimulating the desire to ride—

On the inside

Upon entering the BRILL 1928 MODEL ELECTRIC CAR passengers are greeted by a bright, cheerful and beautiful interior. The wide metal side window sash and sloping wind shields at ends contribute in no small way to the pleasantness of the ride while enjoying the comfort of the Brill 201-B-1 deep spring leather upholstered seats.

The smooth and comfortable riding of the Brill 277-EX trucks under this car, attributed to such important truck features as the Bolster Guide and Graduated Spring System, and the absence of disturbing noises under the carbody, also appeal to the passengers.

The BRILL 1928 MODEL ELECTRIC CAR furnishes the most profitable kind of service—that which stimulates the passengers' desire to ride.

Write for copy of Bulletin 319

Electric Car

The J. G. Brill Company
Philadelphia

American Car Company
St. Louis

The G. C. Kuhlman Car Co.
Cleveland

Wason Mfg. Company
Springfield, Mass.



The Brill 201-B-1 Reversible Seat, with a most comfortable pitch to the back, and wide 42 in. post centers are two features which appeal to the public.



The *Ideal* Final Drive

EVERY added day of experience strengthens the conviction of Timken Axle users that the silent worm is "the ideal final drive;" because of its strength, simplicity, long life, low upkeep.

THE TIMKEN-DETROIT AXLE CO., DETROIT, MICH.

TIMKEN AXLES

MAINTENANCE AND CONSTRUCTION ISSUE

ELECTRIC RAILWAY JOURNAL

raw-Hill Publishing Company, Inc. NOVEMBER 19, 1927 Twenty Cents per Copy

HOUSTON PUBLIC LIBRARY
HOUSTON, TEXAS.



How Many Men Now?

THIS new compression tamping machine does the work of a battery of air or hand tampers—and it *Compresses* the concrete—shoves it smack up against the rail and tie plate—then squeezes it into place. You get a better tamping job—a perfect job—with fewer men.

The new tie laying machine lays ties quickly and accurately, with one man—doing the work that formerly took four! These two machines will cut paved track construction costs remarkably.

With Steel Twin Ties and these new machines you can buy the best track at lower cost than ever.

Write us today for delivered prices for your 1928 program.

THE INTERNATIONAL STEEL TIE CO.
CLEVELAND, OHIO

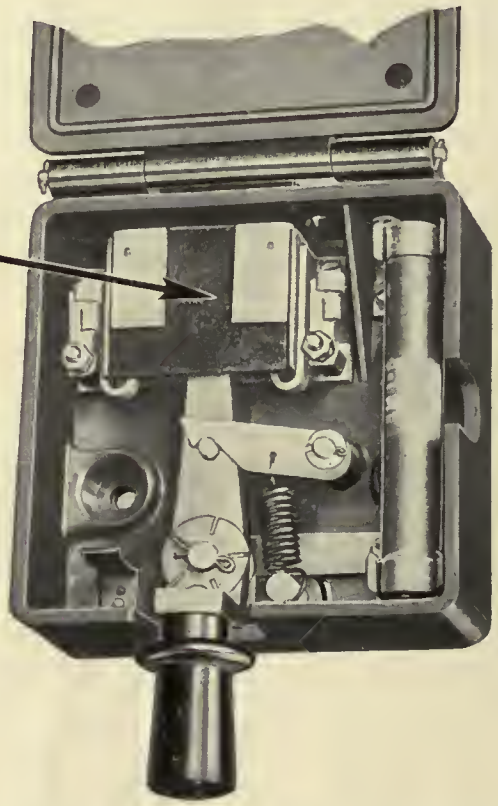


Look it up in your "Paved Track Note Book"

Steel Twin Tie Track

TWIN TIES ARE ALL STEEL

Something *New* In Control Switches



A Magnetic Blowout Without Coil

THIS is one type of control switch for all railway auxiliary circuits, and it will handle all compressor work up to 30 amperes.

No blowout coils are used, therefore the details for all capacities up to the maximum are the same.

All parts are exposed to view when the cover is opened and are readily removed for convenience in maintenance.

Dependable Renewal Parts

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania

Sales Offices in All Principal Cities of the United States and Foreign Countries

MEMBER AERA 1927

Westinghouse

X95577

MORRIS BUCK
Managing Editor
JOHN A. MILLER, JR.
Associate Editor
CLARENCE W. SQUIER
Associate Editor
CARL W. STOCKS
Associate Editor

ELECTRIC RAILWAY JOURNAL

CHARLES GORDON, *Editor*

HENRY W. BLAKE
Senior Editor
GEORGE J. MacMURRAY
News Editor
G. W. JAMES, Jr.
Assistant Editor
PAUL WOOTON
Washington Correspondent
ALEX McCALLUM
Editorial Representative
London, England

Vol. 70
No. 21

CONTENTS

Pages
927-970

NOVEMBER 19, 1927

Editorials 927

Dipping and Baking Practice at Los Angeles 930
Monorail system from dipping tank through oven handles armatures and other heavy parts. Careful cleaning and testing are important features of motor maintenance.

Fort Worth Rehabilitates Cars 932

Mexican Street Cars Are Powered with Automobile Motors 933
BY TERRELL CROFT.

Reduction of Fire Hazards in St. Louis Brings Reduced Premiums 935

Track Rehabilitated in Place 936

Monthly Labor Review Quotes From *Journal's* Article 936

Locomotive Maintenance Shop of the Virginia Railway 937
BY ALLEN McLENAHAN.
A modern repair shop has been recently put into operation at Mullens, W. Va., to care for 36 locomotives on the electrified division.

Harry L. Bullock Wins Monthly Maintenance Prize for October 942
Honorable mention was given to a machine for oiling track curves as submitted by I. O. Mall of the New Orleans Public Service, Inc.

Maintenance Data Sheets 943

Adventures of Old Man Trouble 949

New Equipment Available 950

Association Activities 952

Automatic Substation 952
BY F. N. CAROTHERS.

New Features Embodied in Cars for Dorchester Extension 953
BY E. P. LOCKE.

Frequent, Thorough Inspections Reduce Car Failures 954
BY HENRY CORDELL.

American Association News 956

News of the Industry 957

Recent Bus Developments 963

Financial and Corporate 964

Personal Mention 967

Manufactures and the Markets 968

Pioneer Spirit

THANKSGIVING DAY does more than bring back the memory of the Pilgrim Fathers' acknowledgment of their first harvest in America. It is only one of the traditions handed down by the early colonists along with their unconquerable pioneer spirit and their faith and courage, which have meant and continue to mean so much to the nation.

Wielders of the axe of progress, they turned forests into harvest fields and blazed trails through trackless woods. Fathers of our country, they led the way through and out of the wilderness.

Pioneers in our industry reflect this spirit. They are clearing out antiquated equipment, notching and blazing the trails through indifference and misunderstanding. Bent on winning public co-operation, they are intent on wresting success out of difficulty.

The JOURNAL, searching constantly for new paths to accomplishment, surveys the field each week for marks of progress. It carefully picks out the blind alleys from the highways, and when the industry falters spurs it on toward the goal of better transportation.

McGRAW-HILL PUBLISHING COMPANY, INC.
Tenth Avenue at 36th Street, New York, N. Y.
New York District Office, 285 Madison Ave.

JAMES H. McGRAW, President
JAMES H. McGRAW, JR., V.-P. and Treas.
MALCOLM MUIR, Vice-President
EDWARD J. MEHREN, Vice-President
MASON BRITTON, Vice-President
EDGAR KOBAK, Vice-President
C. H. THOMPSON, Secretary

WASHINGTON:
National Press Building
CHICAGO:
7 S. Dearborn Street
PHILADELPHIA:
1800 Arch St.
CLEVELAND:
Guardian Building
ST. LOUIS:
Bell Telephone Building
SAN FRANCISCO:
883 Mission Street
LONDON:
6 Bouverie Street, London, E. C. 4

Member Associated Business Papers, Inc.
Member Audit Bureau of Circulations

Cable Address: "Machinist, N. Y."

Publishers of
Engineering News-Record
American Machinist
Power
Chemical and Metallurgical Engineering
Coal Age
Coal Age News
Engineering and Mining Journal
Ingeniería Internacional
Bus Transportation
Electrical Railway Journal
Electrical World
Industrial Engineering
Electrical Merchandising
Radio Retailing
Construction Methods
Electrical West
(Published in San Francisco)
American Machinist—European Edition
(Published in London)

The annual subscription rate is $4 in the United States, Canada, Mexico, Alaska, Hawaii, Philippines, Porto Rico, Canal Zone, Honduras, Cuba, Nicaragua, Peru, Colombia, Bolivia, Dominican Republic, Panama, El Salvador, Argentina, Brazil, Spain, Uruguay, Costa Rica, Ecuador, Guatemala, Chile and Paraguay. Extra foreign postage to other countries $3 (total $7 or 29 shillings). Subscriptions may be sent to the New York office or to the London office. Single copies, postage prepaid to any part of the world, 20 cents.

Change of Address—When change of address is ordered the new and the old address must be given, notice to be received at least ten days before the change takes place.
Copyright, 1927, by McGraw-Hill Publishing Company, Inc.
Published weekly. Entered as second-class matter, June 23, 1908, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Printed in U. S. A.

BETTER TRANSPORTATION

Here's the newest aid to track betterment



Flexible manipulation of grinding wheel is made easy.



Grinding wheel arm swings aside to pass cars without removing trolley pole.

Eureka Radial Rail Grinder

A small, light, portable grinder for use where flexible manipulation of the grinding wheel is desirable. Fine for grinding Thermit joints before finishing with the "Vulcan" which then makes a perfectly smooth joint.

Eureka is also suitable for grinding off surplus weld metal under heavy traffic conditions. Swivel joints permit tilting the grinding wheel at any angle, at the same time allowing grinding wheel to travel in a straight line. A small hand wheel raises and lowers the grinding wheel. Ball and roller bearings keep friction minimized.

Eureka, with grinding wheel, weighs 375 pounds. It's 46 in. from grinding wheel to vertical column extended, 36 in. when telescoped.

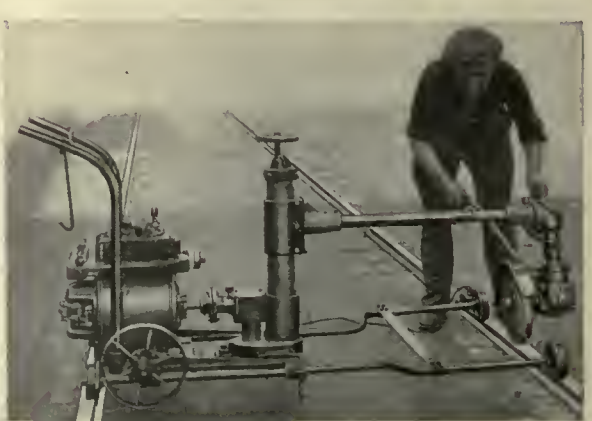
With arm swung into position against handles, Eureka measures 40 in. overall, 26 in. wide, 34 in. high. The 10 in. diameter, 1 in. face grinding wheel runs at 1950 r.p.m., with a 1½ hp., 550 v. d.c. ball bearing motor, made especially for its job.

Railway Track-work Co.

3132-48 East Thompson Street, Philadelphia

AGENTS:

Chester F. Gailor, 30 Church St., New York
Chas. N. Wood Co., Boston
Electric Engineering & Mfg. Co., Pittsburgh
H. F. McDermott, 208 S. LaSalle St., Chicago
Equipment & Engineering Co., London
P. W. Wood, Railway Supply Co., New Orleans, La.
Frazar & Co., Japan



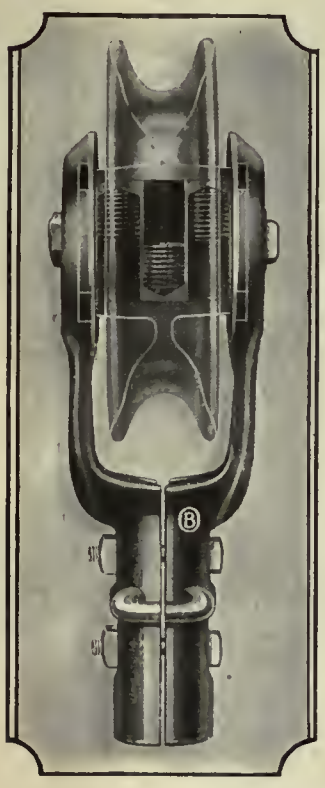
Eureka with Outrigger for open track.

O-B ENDURANCE IS SERVICE INSURANCE

Measurement of the wheel bore shows .014-in. wear after 19,400 miles. Axle showed considerable less wear and was again put in service. Graphite plugs which were used during the entire life of the wheel are shown below.



19,400 Miles Without Attention— An O-B Feist Trolley Wheel



Phantom view showing self lubricating graphite plugs used in O-B Feist Trolley Wheel.

FROM September 26 to February 4, the trolley wheel pictured above ran 19,000 miles *without oiling or attention of any kind.* After replacing the wheel, the original graphite lubricating plugs and axle were again put in service.

Eight other O-B Feist Trolley Wheels used by this city property have run over 16,000 miles and are still running.

Reports from electric railways in all parts of the country indicate that O-B Feist Trolley Wheels are running up similar mileage records—from two to three times the service formerly obtained. Net savings in dollars and cents amount to as much as one-third the previous cost of current collection materials and labor.

Here is an opportunity to make a substantial reduction in your 1928 trolley wheel costs. Folder 74C, sent on request, gives detailed information.

Ohio Brass Company, Mansfield, Ohio
Dominion Insulator & Mfg. Co., Limited
Niagara Falls, Canada
336C

Ohio Brass Co.

SALES OFFICES: NEW YORK CHICAGO PHILADELPHIA PITTSBURGH CLEVELAND SAN FRANCISCO LOS ANGELES

PORCELAIN INSULATORS
LINE MATERIALS
RAIL BONDS
CAR EQUIPMENT
MINING MATERIALS
VALVES

Greater Strength—Fewer Flats Increased Safety Longer Life



All these advantages are possessed by Davis "One-Wear" Steel Wheels. Of all steel wheels Davis "One-Wear" Wheels alone do not raise repair costs. They are therefore worth more.

ASF

AMERICAN STEEL FOUNDRIES

NEW YORK CHICAGO ST. LOUIS

Golden Glow



All types of Golden Glow Railway Headlights may be fitted with refracting lenses, as illustrated.

Prestige and Service!

These two factors go hand in hand. For better service will quickly build up prestige.

And good lighting plays an all-important part in providing better service and in making the modern car more attractive, more business-like, more profitable.

Prepare now for the winter nights ahead when rush hours are dark and weather is often stormy. Send for our latest pamphlets to learn about the business-building possibilities of Golden Glow Headlights.

Home office and plant at 17th & Cambria Sts., PHILADELPHIA; District offices at 230 So. Clark St., CHICAGO; 50 Church St., NEW YORK; Bessemer Bldg., Pittsburgh; 88 Broad St., Boston; General Motors Bldg., Detroit; 316 N. Washington Ave., Scranton; Canadian Agents, Lyman Tube & Supply Company, Ltd., Montreal, Toronto, Vancouver.

ELECTRIC SERVICE SUPPLIES CO.

MANUFACTURER OF RAILWAY, POWER AND INDUSTRIAL ELECTRICAL MATERIAL



Why Wasn't the *Great Eastern* A Success?

The "Great Eastern," first of the gigantic liners, built in the fifties, was a splendid boat. It had every comfort and facility to recommend it.

But it was a financial failure because traffic then wasn't dense enough.

There are thousands of places in the United States where a small bus, economical in first cost and in operation, will make good profits where a big bus would lose.

The Fitzjohn 12 passenger body, mounted on any good light chassis, is the outstanding job of this class. Sturdy, it keeps maintenance down where it belongs—beautiful—splendidly appointed, it is a veritable passenger magnet.

If you are operating "Great Easterns" where they can't make money—if you are hesitant about extending into light travel territories, by all means get the Fitzjohn story.

Luxury
Economy
Sturdiness

Fitzjohn

Fitzjohn Manufacturing Company

Exclusive Bus Body Builders

Muskegon, Michigan



One of the Variable Load Brake equipped cars of the Brooklyn City Railroad Company. These cars are serving dependably, making possible short, uniform stops, a saving of time, and consequently a superior service.

Don't DRAG along with the traffic . . . . . Lead it!

INTENSIVE service has come to be recognized as the only solution to city traffic problems. Modern light weight cars, in hundreds of instances, have satisfied their operators with their dependable service in running the gauntlet of traffic congestion.

With these modern light weight cars and the Westinghouse Variable Load Brake, uniform stopping distances are possible . . . an obvious time saving feature and a valuable aid in holding position in traffic lanes.

Eliminating guesswork on the part of the operator as to the retarding force necessary as passenger load changes, the Westinghouse Variable Load Brake automatically accepts this responsibility, giving the operator the braking confidence he needs in bucking modern traffic complications.

The Westinghouse Variable Load Brake assures uniform stopping distances from day to day and year to year, with full, half-full or empty cars.

More complete information, relative to the numerous advantages of the Westinghouse Variable Load Brake, may be had through any of our conveniently located offices, or by addressing the Westinghouse Traction Brake Company at Wilmerding.

WESTINGHOUSE TRACTION BRAKE CO.

General Office and Works, Wilmerding, Pa.

2221

WESTINGHOUSE TRACTION BRAKES



They used lighter rail and the saving in cost practically paid for the welding job done with



Thermit

RECOGNIZING that the rail joint is ordinarily the weak spot in any track structure, several progressive railway properties have found that lighter rail can be used through elimination of the joint by Thermit Welding. In this way a track structure amply strong for the traffic is obtained, with a materially reduced tonnage of steel rail. In fact the savings in cost of rail, freight and handling, have been approximately enough to pay for welding with Thermit. The resulting job is smoother riding and it entails no future cost for maintenance of joints.



On one prominent road, one time winner of the Coffin award, the use of Thermit has permitted 103 lb. rail to replace a 134 lb. section,—a saving of 31 lbs.



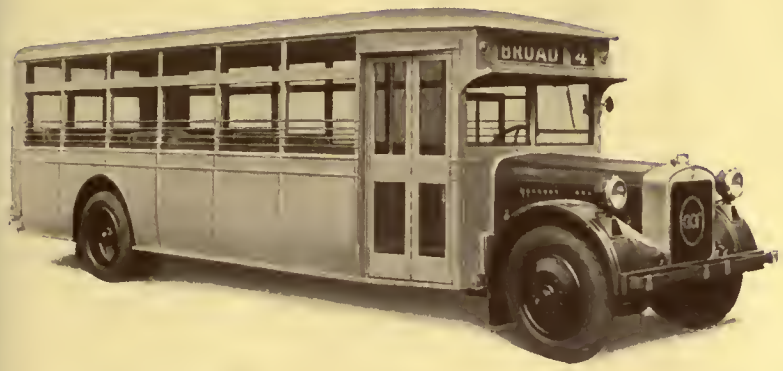
METAL & THERMIT CORPORATION

120 BROADWAY, NEW YORK, N.Y.

PITTSBURGH CHICAGO BOSTON SOUTH SAN FRANCISCO TORONTO

a.c.f.
Hall-Scott

The $1,000,000 Verdict

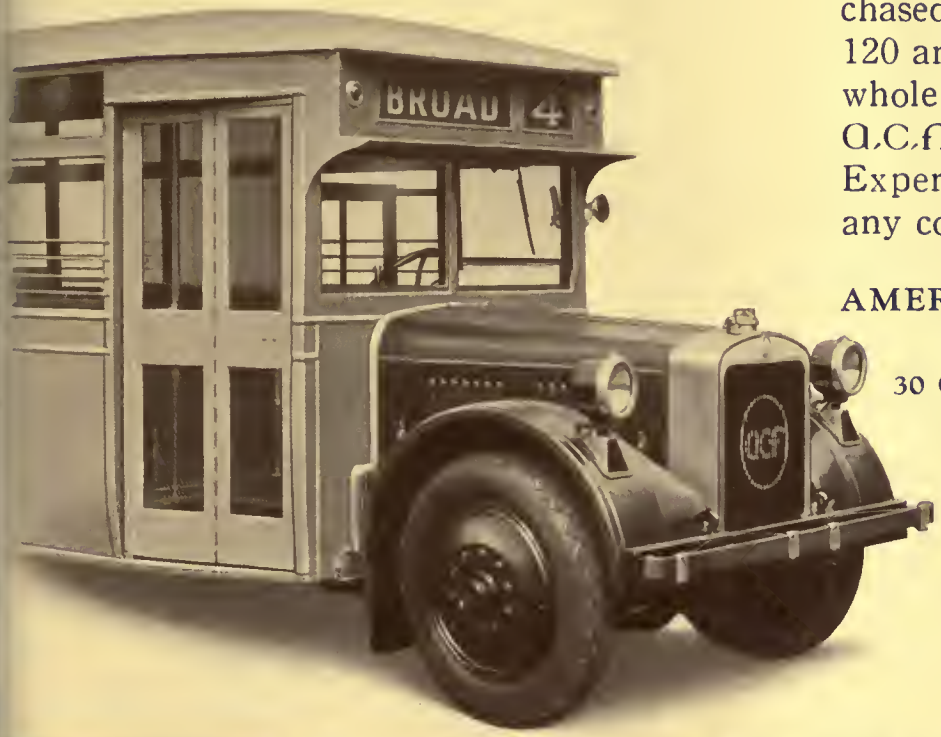


The largest coach-operating electric railway in the country has backed its high opinion of A.C.F. coaches with a million dollars! Here is the record for 1927:

65 FEBRUARY
A.C.F. Gas-Electric Coaches

20 AUGUST
A.C.F. Mechanical Drive Coaches

35 AND NOW
A.C.F. De Luxe Urban Coaches



Of the 187 six-cylinder coaches purchased by Public Service this year, 120 are A.C.F. coaches—64% of the whole six-cylinder business goes to A.C.F.—the million dollar verdict of Experience—a significant guide to any coach operator.

AMERICAN CAR AND FOUNDRY MOTORS COMPANY
30 CHURCH STREET, NEW YORK

PUBLIC SERVICE





De Luxe Urban Coach Operation Endorsed by Public Service

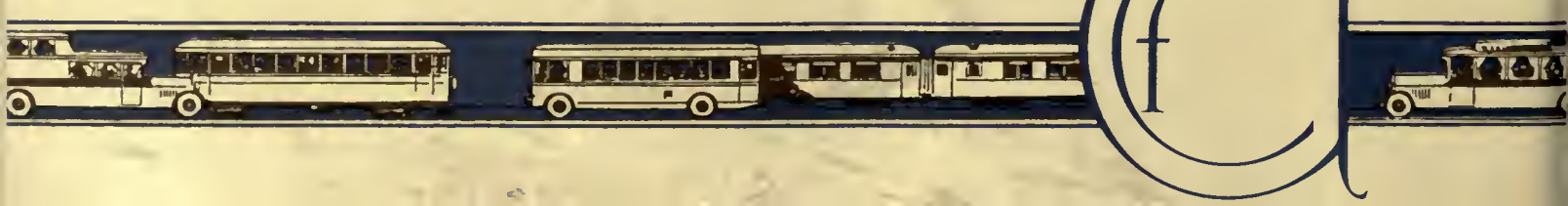
De Luxe Urban Coach Service is a direct challenge to the private motor car. By furnishing attractive, high grade transportation (with accommodations for standees in rush hours if necessary) a load factor sufficient for profitable operation is attained. A high ratio of passenger miles per coach mile may be maintained at higher than average rates of fare!

The thirty-five A. C. F. De Luxe Urban Coaches ordered by Public Service demonstrate how A.C.F. progressiveness in design enables electric railway operators to capitalize profitably on every trend in mass transportation.

Noted operators have convinced themselves of the unique ability of A. C. F. coaches to furnish high-income revenue-transportation. Orders and repeat orders, on every type of operation, are the proof.

AMERICAN CAR AND FOUNDRY MOTORS COMPANY
30 CHURCH STREET, NEW YORK

A.C.F. builds the most comprehensive line of motor coaches ever offered by a single manufacturer. Capacities from 16 to 60 passenger. All body types and styles. Quality considered, prices are low.



HAMILTON, ONT.



NP

THEY USE THEM IN CANADA, TOO

SIXTY-FOUR cities have adopted, or will place in operation (during 1927), 2,829 cars equipped with more than 5,000 treadle exit doors. At least a dozen of these cities are in Canada. Hamilton, Ontario, for instance, will make use of 36 cars equipped with treadles.

Calgary, Edmonton, Ottawa and Vancouver are among the other Canadian cities which have adopted treadle doors within the year.

NATIONAL PNEUMATIC COMPANY

Executive Office; Graybar Building, New York

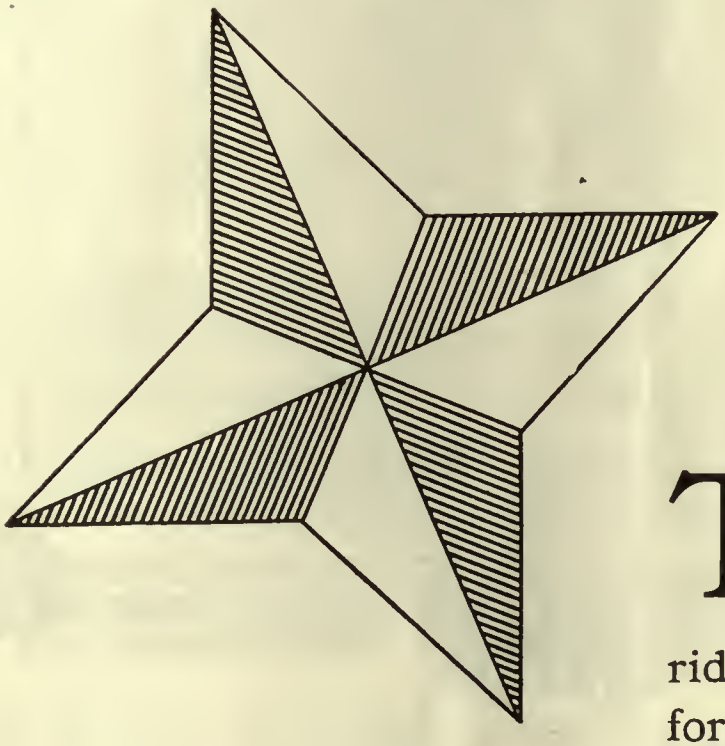
General Works, Rahway, New Jersey

CHICAGO
518 McCormick Building

MANUFACTURED IN TORONTO, CANADA, BY
Railway & Power Engineering Corp., Ltd.

PHILADELPHIA
1010 Colonial Trust Building

No chickens



THE GENERAL Public, it seems, will no longer ride in noisy, uncomfortable and slow-moving electric cars. So revenues on a good many roads have dropped!

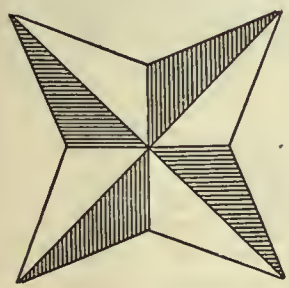
And, since revenues have dropped, how are these roads going to find the money to buy new cars?

It reminds us of the old poser concerning the chicken and the egg. But unlike this riddle of the ages there *is* an answer to our problem. It can, in fact, be solved by any group

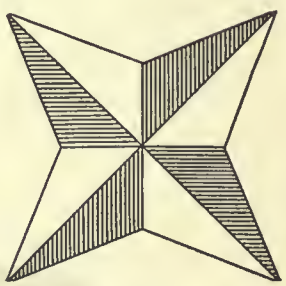
without eggs!

of far-sighted business men in the industry who will bring themselves to look on the electric car as a vehicle of the future and not the past, and who will visualize the effort and investment necessary to develop a service worthy of real leadership. Recent awards of the Coffin Prize prove this beyond doubt.

After all, transportation is today's most insistent basic demand. Salesmanship can win the market here as it has done elsewhere.



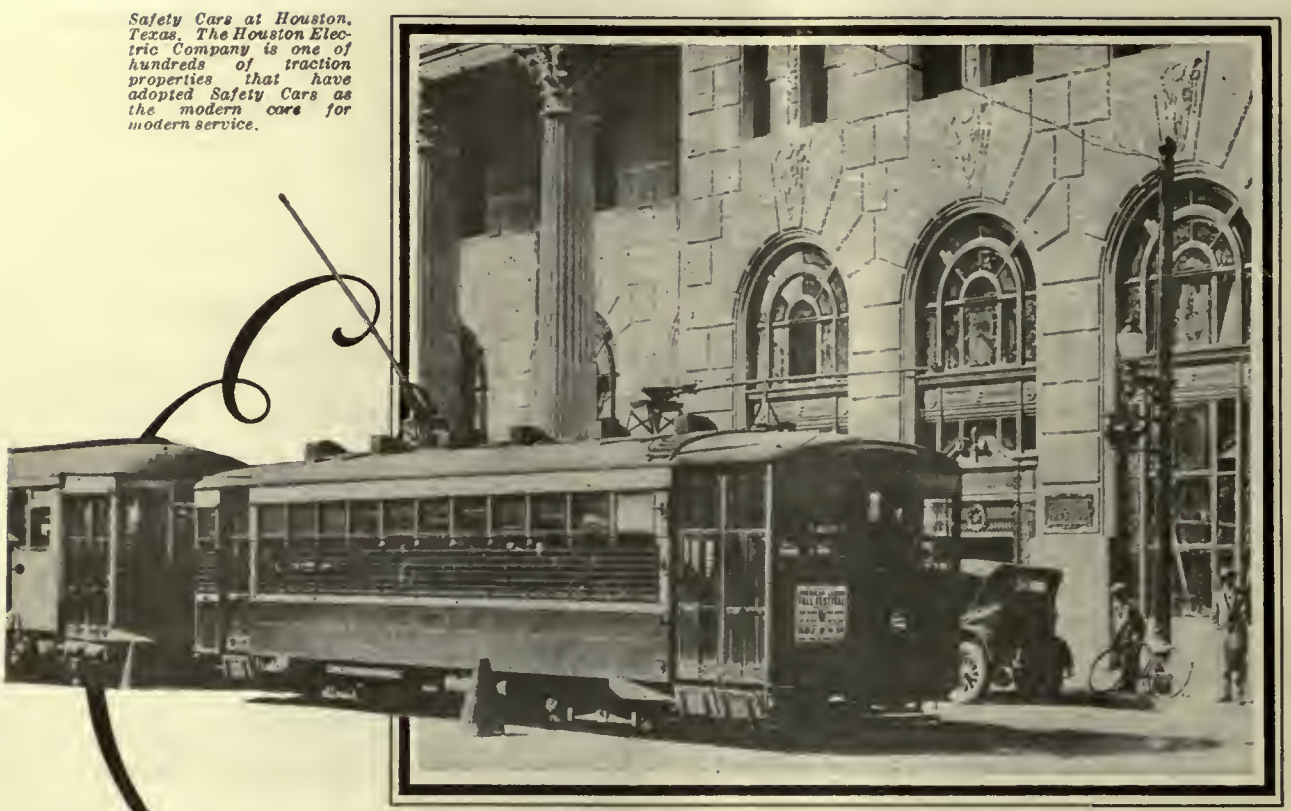
The Four Features of Balanced Design are the Cardinal Points of today's demand



CINCINNATI

BALANCED LIGHTWEIGHT **CARS**

The Four Features of BALANCED DESIGN are the Cardinal Points of Today's Demand



Safety Cars at Houston, Texas. The Houston Electric Company is one of hundreds of traction properties that have adopted Safety Cars as the modern cars for modern service.

Volution has brought the *Safety Car*

WITH transportation progress has come the Safety Car. Progressive traction properties, quick to realize the intrinsic worth of Safety Car Control, adopted it—thus establishing the trend that has led to nation-wide acceptance of the Safety Car—the modern car.

Now firmly established as the standard on hundreds of properties, Safety Cars are consistently proving a stimulus to modern traction service. With their adoption has come a more frequent service, better schedule speeds have been maintained and the reaction of the riding public has invariably voiced itself in the form of increased patronage. Inasmuch as increased patronage means greater revenue, Safety Car adoption is natural.

Detailed information relative to the intrinsic value of the Safety Car may be obtained from any of our conveniently located offices. This service is maintained exclusively for the use of the operator and is in no way obligatory.



3121

SAFETY CAR DEVICES CO.
OF ST. LOUIS, MO.

Postal and Telegraphic Address:
WILMERDING, PA.

CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH

Interlocking the power and brakes by means of special controller handle provides safeguard against operator's inattention or disability.





The sweeper is easily and quickly converted to a utility truck for construction or emergency purposes, by removing the broom and rear cab, and substituting a material body, thus giving year-round service.

The Gas-Electric Snow Sweeper

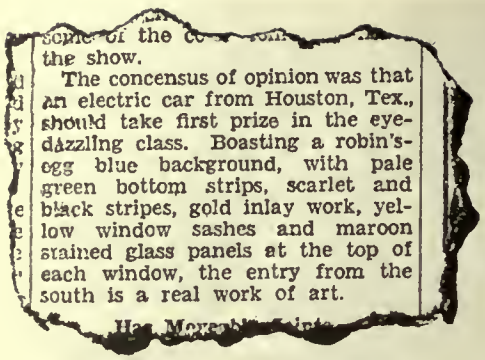
Is a mobile, powerful unit of equal value in clearing car tracks or bus routes of snow. It is of special advantage in removing snow from tracks in front of car barns, or emergency work, freeing stalled cars, etc.

The gas-electric drive gives great flexibility of control, a wide range of speed, and independent control of broom speed. When operating the broom, the sweeper is driven from the rear cab, with broom foremost.

Designed and Built by

CUMMINGS CAR AND COACH CO.

CHICAGO



"The Hit of the Convention"

Houston, Texas, shows how to sell rides!

Back of C. O. Birney's design of this car; backed by Stone & Webster and the Houston Electric Co. which is under the executive management of Stone & Webster, Inc., and back of the Quality Shops' execution of this order there was one BIG IDEA—to *sell rides.*

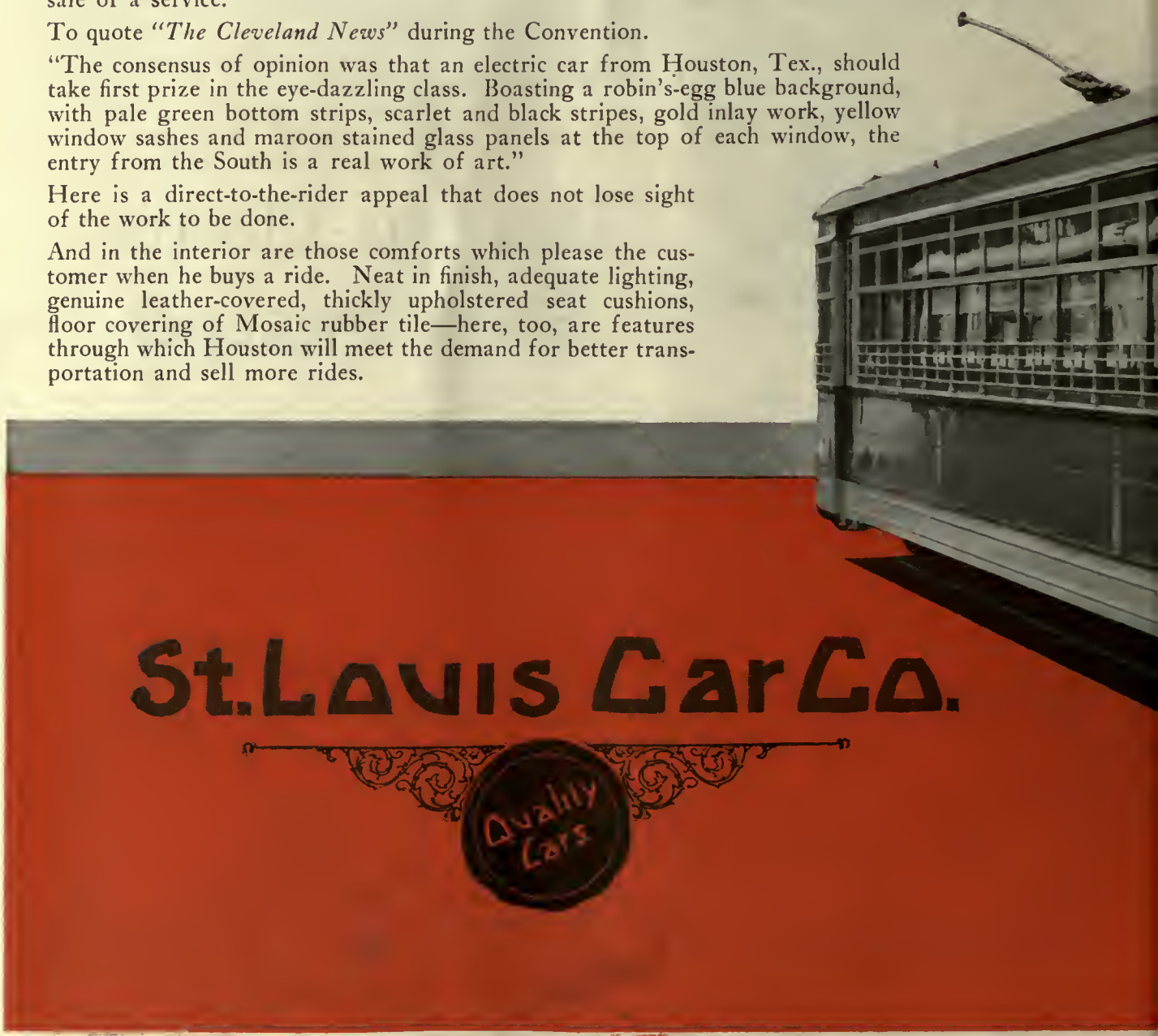
For this car exemplifies outside and inside not only the finest creation of the car builder's art but typifies the application of modern merchandising to increase the sale of a service.

To quote *"The Cleveland News"* during the Convention.

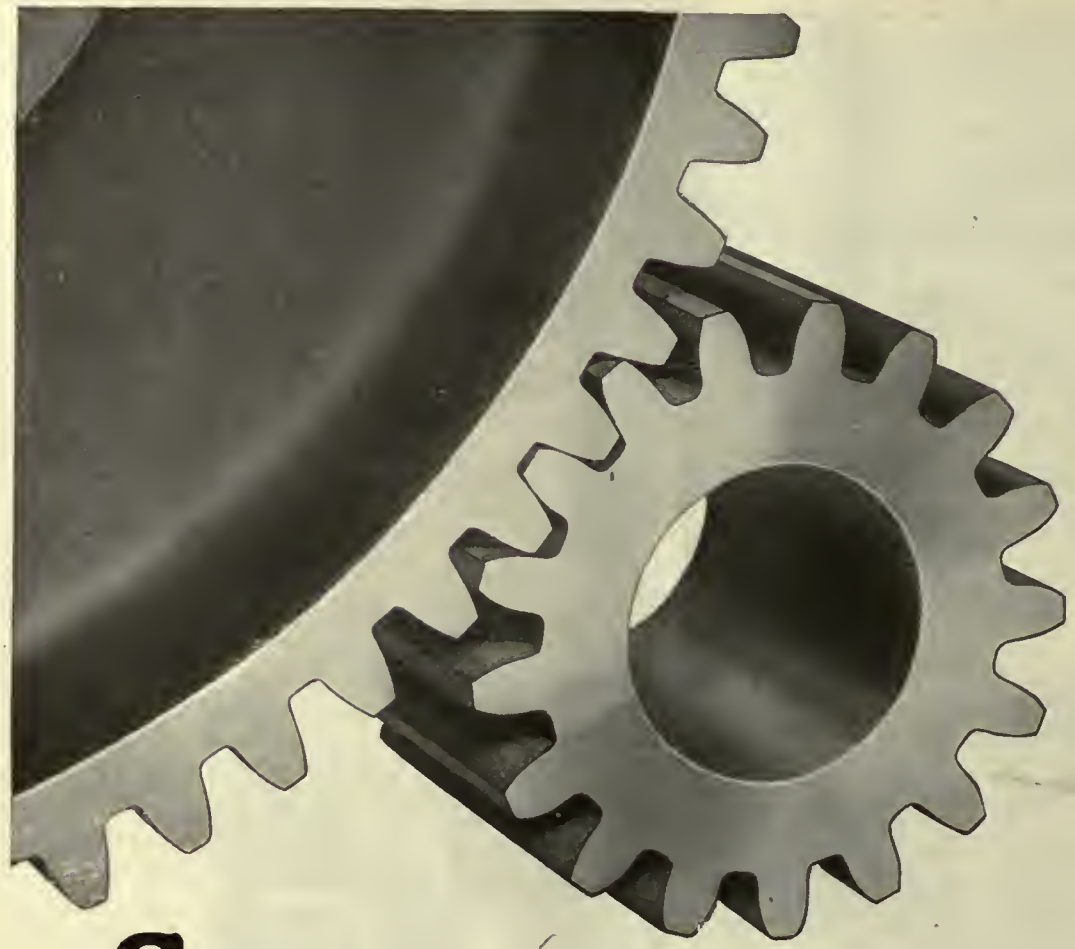
"The consensus of opinion was that an electric car from Houston, Tex., should take first prize in the eye-dazzling class. Boasting a robin's-egg blue background, with pale green bottom strips, scarlet and black stripes, gold inlay work, yellow window sashes and maroon stained glass panels at the top of each window, the entry from the South is a real work of art."

Here is a direct-to-the-rider appeal that does not lose sight of the work to be done.

And in the interior are those comforts which please the customer when he buys a ride. Neat in finish, adequate lighting, genuine leather-covered, thickly upholstered seat cushions, floor covering of Mosaic rubber tile—here, too, are features through which Houston will meet the demand for better transportation and sell more rides.




SPECIAL



Say "Grade M"

Quicker starts and more powerful braking are both needed to keep electric railway cars abreast with the other street traffic. These modern schedules impose operating conditions that send many an ordinary gear or pinion to an early rest on the scrap pile.

Depend upon the gearing which has proved its reliability.

Specify "Grade M".

General Electric has carried its research work in metallurgy, its testing and heat-treating processes on gearing, to the point where a product like the Grade M Gear and Pinion can be installed with absolute confidence.



For
Modern Equipment Standards

330-12

GENERAL ELECTRIC

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review
Published by McGraw-Hill Publishing Company, Inc.
CHARLES GORDON, *Editor*

Volume 70 *New York, Saturday, November 19, 1927* *Number 21*

Choosing Winter Grade Oil Intelligently

MUCH electric railway equipment operated in the United States is exposed to low temperatures during the winter season and under such conditions lubrication becomes a difficult problem. All of the lubricating oils become sluggish at low temperatures, some even to the point of solidification. With the normal flow of lubricants interrupted the moving surfaces in contact are subjected to increased wear due to the lack of lubrication.

It has now become general practice to change the oil used to a winter grade as soon as cold weather approaches. The amount of solidification in oil depends to a large extent on the base used and the content of paraffin wax. In general, lubricating oils refined from naphthenic base crudes in which the paraffin wax content is low, or sometimes even negligible, will show a considerably lower pour test, or temperature of congealment, than those refined from paraffin base crudes unless the latter are suitably chilled and otherwise treated for wax removal in the course of refinement.

Another important point that should be looked after during cold weather is the possibility of ice formation in the lubricating system. Present-day lubricating oils are water free when received from manufacturers, but sometimes, with improper storage, water may gain entry to the oil house or storeroom due to careless exposure of an oil drum to the weather, or to the activities of some laborer in cleaning the oil house. It is good practice never to use a hose in an oil house where lubricants are stored.

Water will settle to the bottom of any lubricating system and will freeze should the temperature drop sufficiently. The resulting ice of course impairs the lubrication and occasionally actually stops the flow of oil. To meet cold weather conditions be sure to have the proper grade of water-free lubricant.

Does Rail Co-operation Jeopardize Bus Sales?

THOUGH rather carefully worded to avoid a blunt statement of the ideas which it seeks to raise in the minds of its automotive manufacturer readers, *Automotive Industries,* in its issue of Nov. 12, obviously questions the wisdom, from the bus manufacturer's viewpoint, of sales policies based on a continuation of co-operation with electric railways. The article dissects in detail the report of the committee on motor vehicle information recently presented at the Cleveland convention, with the avowed object of showing that the report contains "phraseology and viewpoint most of which is generally associated with a group engaged and interested primarily in a contest or a fight rather than with a group interested primarily in study and development of the most efficient and economic form of transportation for the American public."

If this were the real object of the article the inferences regarding the attitude of electric railways toward buses might in some respects be worthy of careful thought, even though—as the author himself almost admits—the article builds a fabric of generalizations regarding the electric railway attitude as a whole, from disconnected words and phrases hand picked from a particular report. If the object of the article were really to promote the application of sound principles of economics in the determination of transportation policy in the public interest, then at least its intent would be above question regardless of how greatly electric railway men might differ with its inferred conclusions.

It is to the very last paragraph of the article, however, that we must look for its real purpose. Quoting from a similar article published in *Automotive Industries* of Jan. 22, 1927, it says: "It has become increasingly apparent to those interested in promoting the use and sale of motor buses that maximum utilization of such vehicles is unlikely to be reached by leaving to agencies fundamentally opposed to their use the determination of where they are and where they are not suitable." Thus, the maximum utilization of motor buses as such, regardless of whether or not existing rail service in a given territory is satisfactorily and economically meeting the public demands for service, is taken by the writer to be sound policy for those interested in manufacturing and selling buses.

Such a viewpoint is at considerable variance with accepted modern principles of sound merchandising policy. The responsible bus manufacturer is building for tomorrow as well as for today. With that in mind his interest in his product does not cease when the sale is made. Not only must he make money in the manufacture and sale of buses, to stay in business, but his customer, as well, must make money in their operation. Otherwise the market for buses wouldn't last long. To put this another way, the manufacturer is interested—or should be—not only in finding a market for his product, but in sustaining and expanding that market.

The electric railways have proved to be a desirable market for buses, both from the standpoint of volume of purchases and of credit considerations. To that fact, and that fact alone, is attributable the growing co-operation between bus manufacturers and the railways. There is no altruism in this arrangement. There isn't even public spirit in it. It is merely downright, hard-headed good business, and bus manufacturers proved that to themselves by costly experience before the present degree of co-operation was brought about.

What, then, is the answer to the questions raised by

This is the issue in November that is devoted essentially to maintenance and construction subjects

Automotive Industries? Buses are sold to be operated at a profit. Their continued sale does not depend on the whim or the prejudices of any particular group of operators, *but on the ability of the automotive vehicle to earn a continuing profit while discharging in full the obligations of a common carrier.* Wherever and whenever they can do that successfully in co-ordination with existing rail lines they will be used by railway operators, and the prejudices of any particular individual or group will not check even temporarily the inexorable working of economic law. Wherever buses can do this more successfully than can rail lines they will replace rails regardless of whether or not existing operating managements are friendly or unfriendly to their use.

All this, however, is entirely a different matter than the ruthless destruction of existing rail investment by the competition of buses which are not prepared to assume the full obligations of the service which they destroy. It is different than making money with buses by operating them on selected routes representing the cream of the traffic in a given community while the railway continues to carry the burden of rendering a complete transportation service. So clearly are these matters now understood by railway operators, responsible bus manufacturers and regulatory officials that their statement here is almost unnecessary, except by way of clearing up the innuendos contained in the article under discussion, which appear to be directed toward breaking down that co-operation between the automotive and electric railway industries which has been built only through several years of earnest effort by both groups.

But where, then, is the bus manufacturer to look for a continuance and increase in his market? He doesn't need to look far. Some of the more progressive manufacturers are already finding the answer. The bus industry is in a sense entering a new stage. Blunderbuss manufacturing and selling are giving way to scientific design and application. What was formerly merely a bus is today becoming a specialized vehicle for a particular kind of service. This is opening to the bus manufacturer new uses for his vehicles and to the railway man new opportunities for extending the field of his service—*at a profit.* In these last three words lies the alpha and the omega of the bus problem. If the bus manufacturer will concentrate on finding out all there is to know about how to make money with buses discharging in full the responsibilities of a public transportation agency, he needs to worry little about the words and phrases contained in any particular committee report.

Now Is the Time to Check Air Piping

SOME properties have operated the same air equipment on their cars for years without troubles due to climatic changes. Standard inspections have been given and the only change made in the maintenance schedule during the winter months has been to drain the air reservoirs more frequently. However, on modern cars with pneumatic safety devices and on the old cars when similar devices were installed trouble began to develop during cold weather due to moisture freezing in the pneumatic apparatus.

During the past winter some railways spent considerable money for various anti-freeze compounds. Others found it necessary to organize blow-torch brigades to thaw out frozen valves and other parts on the road. As a result the service suffered from frequent interruptions and the maintenance expense went to abnormal heights. This condition automatically caused a certain feeling of uncertainty in regard to pneumatic safety appliances. In a great many instances the trouble could have been avoided had the apparatus been installed in the proper manner.

Now that the severe winter operating conditions are near at hand it is well to check up on the air equipment and rectify any faults which might cause a repetition of some of the troubles experienced the past winter. For instance, care should be taken to see that all of the piping is installed so as to prevent the formation of water pockets and that all the pipes drain toward a common point. With this taken care of and suitable cooling coils installed a great many of the service interruptions due to pneumatic freeze-ups will be obviated.

Where Saving With Home-Made Devices Was an Expense

SOME surprising comparisons have been made by one large city railway system between the cost of making its own overhead line materials and the cost when purchased from a manufacturer. This company for years made its own overhead materials, but more recently has been purchasing similar material from a leading manufacturer. During the first six months of 1924 rigid cross-overs made by the company required 220 replacements, while for the same period in 1927 only 29 replacements were necessary with the rigid cross-overs purchased from the manufacturer. Home-made adjustable cross-overs required 262 replacements during the first six months of 1924, while in the first six months of 1927 only 82 of the manufacturer's adjustable cross-overs were needed.

In the first half of 1924 861 home-made copper splicing sleeves were used, while in the 1927 half year only 303 of the manufacturer's splicers were needed. In this instance the railway is still in the process of replacing the old sleeves with the manufactured product, so that the ultimate difference between the requirements for splicers of the two types will be greater after all the home-made ones have been taken out of service.

As to the effect on continuity of service, the difference has been marked. Substitution of manufactured trolley ears for a home-made mechanical clip on the downtown heavy traffic streets has been accompanied by a reduction of emergency calls for ear troubles from more than two a week to none in a period exceeding three months. Frogs purchased from a local foundry cost $5, as compared with $8 for a well-known commercial type. But the $8 frog repeatedly demonstrated its ability to outlive the local foundry frog by giving three times the length of service. Thus the apparent saving of $3 for one frog was really a loss of $7 for material alone without taking into account the cost of installing two additional frogs to make the local product give a life equivalent to that of one frog manufactured by the specialist.

Most important of all is the relationship between these various devices used in the overhead line and the number of trolley wire breaks. In the year 1919 this company had 141 breaks. By 1926 this had gone down to 81 breaks, and in 1927 there were only 28 breaks in the first eight months, compared with 56 in a similar period of last year. This progressive improvement is at least in considerable part due to the lessened wear and burning of the wire, showing that the manufacturer had utilized in his designs the broad experience gained from a study of his devices as used on many properties.

An Interesting Experiment in Fares

CONSIDERABLE importance attaches to the change in fares on the Key System Transit Company's lines which was ordered by the California Railroad Commission on Nov. 11. With insufficient revenue, the company in January, 1926, obtained an increase on its city lines from the 6-cent fare, which had been in effect for several years, to 7 cents in the hope of getting more revenue. The increase was only about one-fourth of the amount needed, so that the new plan has been devised in the hope of gaining the amount which was desired when the present fare was adopted nearly two years ago.

The new plan, which goes into effect on Dec. 10, is an innovation in this country. Briefly, it calls for a 10-cent cash fare, a 5-cent short-haul fare good all hours in each of two areas, a $1 weekly pass and an off-peak cash fare of 5 cents between the hours of 9 a.m. and 4:30 p.m. A $1.50 weekly pass, good in two or three zones, also is a part of the plan.

Frankly, the basic idea is that this combination of high cash fare with reduced rates for off-peak riders and regular customers will so increase the traffic on the line that the revenue will be much greater than before. The chief engineer of the commission estimates that the increase in revenue due to the off-peak fare of 5 cents will be anywhere from 25 per cent to 100 per cent. There is no precedent in this country on which to base an opinion. There is a somewhat similar off-peak fare on the lines of the London County Council Tramways, although conditions there are widely different because the system is almost entirely in competitive territory. Moreover, there is no combination with the weekly pass as in the present instance. The commission evidently regards the plan as an experiment and that the rates will have to be changed again if the results fall below expectations. Whatever the outcome, it will be awaited with interest by the entire industry.

Discarding Surplus Material Is an Economy

MANY good housewives have attics filled with surplus material from days gone by. That old bonnet may some day be made over for one of the girls, when the style comes back, and in a few years Johnny may be able to wear father's cast-off pants unless the moths get to them first. Courage is necessary when one decides to throw away something that appears perfectly good and which may be of value some time in the future. Only the bravest, realizing that in future years a new generation might find the discarded relics and put them in the fire, will call in the old clothes man and take the few cents he offers.

So it is with the stores department of the average railway. Materials and parts are ordered for some specific purpose, and to insure that repairs can be made without delay there is a small surplus kept on hand. Finally the motor, the truck or the car is discarded and a new type takes its place. Often, the stock of repair parts is retained on the shelves, taking valuable space and keeping alive a set of ledger accounts for the unused material. It is too good to throw out as scrap, and yet the chance that it ever will be used for its original purpose, or even for any purpose, is practically nil.

The committee on purchases and stores of the Engineering Association in its 1927 report realized this situation, for it has made a careful analysis of the problem. The committee recommends, first of all, that a company endeavor to dispose of surplus materials through company subsidiaries or nearby companies; if that fails, to advertise in trade papers or seek an outlet through second-hand dealers. As a last resort the material should be scrapped.

As to the results, the committee finds that one large company during a period of three years has worked along these lines and disposed of many thousands of dollars' worth of surplus stock at prices running from 39 to 50 per cent of the ledger value, while other companies have obtained equally satisfactory results. Surely a subject so carefully analyzed is not open to debate. Every storekeeper in the industry who has not already done so should at once start to clean house.

Red-Headed Mary Smith, Alias Mae Smythe

PAINT has many purposes. Most of them are utilitarian. "Save the Surface and You Save All" has seeped in as a practical slogan paying dividends in dollars saved. Although in the past railways have not been sparing of paint, their car color schemes have had somber hues. That was considered good practice. It was economical. It was a matter of paint considered entirely from the utilitarian point of view. It took no account of increased visibility; neither did it take into account the possible passenger pulling power of color. In their over-emphasis on usefulness, the railways failed to be color conscious. Their equipment merely mirrored the thinking of their day, that allurement and attractiveness were on a different plane from utility, and not on too high a plane either.

The most recent riot of color is better than the somber hues of the past, provided the contrast is not too pronounced. A street car in desert sand, deep cream, pyramid gray and red fire served only to remind a wag of the girl who talks about her "auburn tresses" and signs herself "Mae Smythe," but whom he knew for better or for worse as "that red-headed Mary Smith." Of course, there was a little affectation in Mary Smith assuming the rôle she did, but even affectation is a good thing if it is not carried too far. And so it is with the railways. Isn't it a little more alluring to proclaim to the public that a car is desert sand than to say that it is reddish gray? Isn't it much better to say that an assemblage is a gang, if it really is the latter and not the former?

But if paint has its purposes in industry when spread on the outside, it also has its so-called internal uses. These were discovered long ago in connection with the problem of interior illumination in shop and office. And now comes the use of color in the painting of machinery. One of the first of these apostles was the man who painted his linotype machines and printing presses white. He was a pioneer. But he won many votaries. The latest of these is the man who has announced the choice of ornate colors for the machinery in his electric railway shop. The color scheme to be adopted is apparently still in the making, but what if he does decide his lathes shall be in lavender, his borers in blue and his wheel press in pink? Of course, they will still be the same tools, but they will take on added prestige. Are things any the worse for a little bit of attitudinizing? We know Mary, if we know her at all, for what she is. And so it is with things utilitarian. We are not likely to be defrauded and mistake for something else a street car in pyramid gray or a lathe in lavender. It is a mauve age. White houses with green shutters have not passed out entirely. Let us use colorful words in describing the hues that are chosen, but let the painting go on.



An I-beam traveling system passes through the ovens and out the rear end

Dipping and Baking Practice

at Los Angeles

Monorail system from dipping tank through oven handles armatures and other heavy parts. Careful cleaning and testing are important features of motor maintenance

ON AN average 140 motors per month are overhauled in the shops of the Los Angeles Railway, Los Angeles, Cal. Repairs and maintenance to motors are given close attention by this railway as these parts of the car equipment are exposed to the dust of the roadbed and extremes of moisture. As a result the insulating elements are deteriorating continually and if not properly cared for the insulation breaks down. The resulting short circuits of this nature probably account for a greater proportion of the entire motor failures than all other causes combined. The overhauling system of the railway provides that motors will be shopped periodically and by following this practice the number of breakdowns in service has been reduced to a minimum.

When a car is brought into the shop for overhauling, motors are dismounted, the armatures are removed and the windings are uncovered. Dust is blown out by compressed air and oil and grease are removed. The armature shaft is then drilled and tapped in the commutator end to take a suspension hook which is used for transporting the armature during the dipping and baking which follow. Armatures weigh from 300 lb. to 590 lb.

After the preliminary cleaning, the armature is given a thorough test to determine whether rewinding is necessary. Where the windings are but partially damaged and stripping and rewinding are unnecessary, the proper repairs are made and the armature is then given the regular varnishing and baking. Whether windings are repaired or not, every armature is dried out thoroughly, varnished and baked before it leaves the shop.

To protect the pinion end of the armature shaft a light sheet metal cup is placed over it before the armature goes to the varnish vat, obviating cleaning after the baking. A quite elaborate I-beam overhead monorail system has been installed. The armatures are suspended from the trolleys by the hooks in the ends of the armature shafts. The details of this construction were published in Electric Railway Journal for May 21, 1927, page 897.

In preparing armatures for varnishing, they are given a preliminary baking in the oven. This preheating requires some twelve hours and it is considered important to keep the temperature at 205 deg. F. In specially wound armatures or coils the cotton covering of the wire usually contains an appreciable amount of moisture, which should be driven off before varnishing. This is also true to a limited extent in armatures where the windings have not been renewed. The preheating also expands the air inside the coils and promotes deeper varnish penetration than could be obtained otherwise. The preheating further makes it possible to reduce the period of varnish baking.

Armatures are removed one at a time from the preheating oven and are removed by the overhead trolley to the dipping tanks, which are raised by hydraulic pressure. The armature remains stationary and the raising of the tank submerges the armature up to the level of the commutator. An armature is allowed to remain in the varnish twenty minutes, after which the tank is lowered. The armature, after being allowed to drip, is then pushed into the baking oven, where it remains for 48 hours. The baking temperature varies with the size of the armature between 200 deg. and 250 deg. F. It is found that this temperature does not injure the cotton covering of the wire and that in 48 hours the varnish is not only well dried but thoroughly oxidized. The protective film produced is tough and moisture proof.

The baking of the dipped armature is considered one of the most important of the series of operations. Underbaking will leave the varnish soft and liable to be thrown off by centrifugal force when the armature is placed in service, leaving it unprotected and out of balance. The solvents and thinners remaining in under-baked portions also decrease the dielectric strength and are apt to promote deterioration in both the fabric and insulation. Over-baking of insulation represents an economic loss in the heat consumed beyond that necessary, but, more important still, it also tends to shorten the effective life of the varnish in service. It is therefore considered very important in baking to maintain the proper oven temperature and to hold all parts of the oven at the same temperature to get uniformity of bake throughout. The fumes and gases from the volatile oils driven off by heat are removed immediately in order to maintain the most effective drying conditions in the oven. Oxygen in sufficient quantity must be available in order properly to oxidize the heavier oils in the varnish compound.

Another important factor in securing satisfactory results is to maintain the varnish at proper consistency and free from foreign substances. This is not difficult if proper attention is given.

The oven equipment used by the Los Angeles Railway was furnished by the Young Brothers Company, Detroit, Mich. The equipment includes a three-compartment, insulated, steel-panel oven. The long compartment is divided in the center, with swinging doors to permit a reduction of capacity when the number of armatures is below normal. Each compartment is 4 ft. 6 in. wide by 7 ft. 9 in. high with double doors at the end 3 ft. by 6 ft. 6 in. The preheating compartment is 7 ft. 6 in. long, while the two varnish baking compartments have a combined length of 30 ft.

The oven walls are 2 in. thick and the preheating compartment has a capacity of four of the larger armatures or six of the smaller ones. The 30-ft. baking compartment will hold 24 of the smaller armatures or twenty of the larger size.

The preheating oven is heated by six General Electric units connected in delta with a total load of 22.8 kw. The baking oven carries eighteen General Electric units connected partially in Y and partially in delta with a total load of 53 kw. The location of the heaters in each oven provides correct heat distribution throughout the interior and insures that each armature has the same heat intensity.

The current supply to the heaters is regulated by automatic control and the temperature is retained uniformly without drop except when the doors are opened to admit freshly dipped armatures or to remove completely baked units. The drying oven is ventilated entirely by adjustable roof ducts, while in the baking oven there is a balanced system of roof and floor ducts. Each half of the bake oven has a stack with a sump just over the oven roof for cleaning.



The dipping tank is at the front end of the ovens

The ventilation of ovens in which electrical insulating compound is baked must satisfy at least two main requirements. The vaporized chemical driers and lighter oils may be either inflammable or explosive, depending on their density, and air mixtures must be diluted and removed in such a way as to prevent their becoming a fire menace. Sufficient air must also be admitted to effect a satisfactory oxidation of the heavier oils to produce a tough, impervious exterior film on the completed armature.

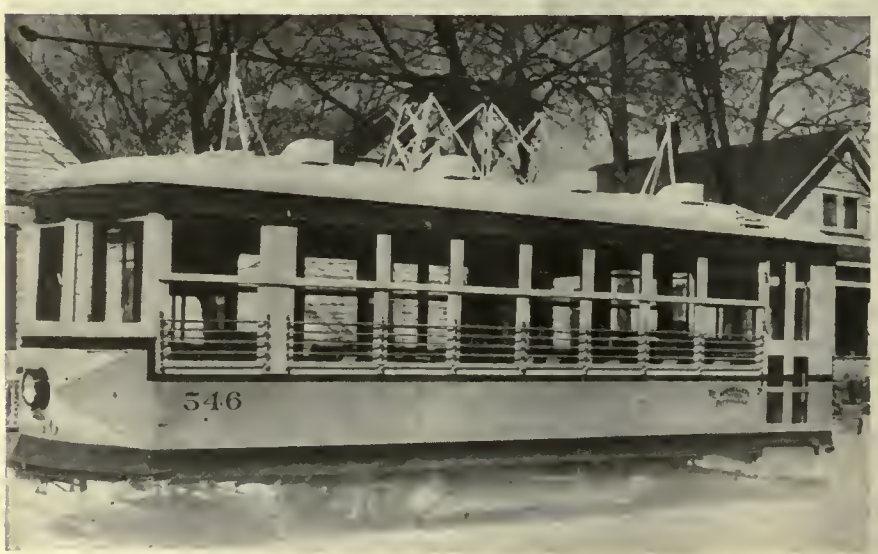
The building program of the Los Angeles Railway provides for a new armature winding shop. When this is built the ovens will be moved into it. Consequently, in choosing the oven for this work, proper consideration was given to the type which could be removed at a minimum expense. This and the low cost of operation were deciding factors in the choice of this particular type of oven.

Fort Worth Rehabilitates Cars

IN ITS campaign this year for "more riders and more revenue" the Northern Texas Traction Company, Fort Worth, Tex., has carried on a car rehabilitation campaign, according to its brief in the Coffin contest for 1927. This has included both its interurban and city service. In an article on page 246 of the issue of this paper for Feb. 5 George Hoskins, master mechanic of the company, described the latest type of interurban car used by the company between Fort Worth and Dallas and known as the "Crimson Flier." Coincidentally with the improvements made in its interurban rolling stock, the company has also remodeled its local interurban cars and its double-truck city cars.



The interiors have been equipped with leather-upholstered seats, heavy linoleum on the floor, sanitary handholds, nickel-plated fixtures and treadle door operation



These city cars have been painted with pennant end and stream-line effect

The local service between Fort Worth and Dallas is handled in normal times by four motor passenger cars. Originally the roofs of these cars were of the monitor type with deck ventilators. This type of roof leaks easily, particularly around the deck sash. All of the later cars have arch roofs with metal ventilators.

This same type of roof was installed on all cars. The floors were covered with linoleum of the same pattern used in the limited trains, namely, of 6-in. blue and white inlaid blocks with a clouded effect over the whole. The original side lighting was replaced by dome light fixtures in the center of the car.

Basket racks that were on the panels above the windows were replaced by nickel-plated coat and hat rack hooks. Bevel plate glass mirrors were placed on the window posts in the rear compartment and matchbox holders were placed on the window posts in the smoking compartment. The original seats were replaced by bucket type, air-cushioned double seats, upholstered in genuine blue Spanish leather. Nickel-plated wash stands, plate glass mirrors, paper towel dispensers and waste towel receivers were installed in the toilets. All metal car trimmings were nickel plated.

The floor of the rear vestibule was covered with green cork linoleum and a baggage rack was built in on the right-hand side. A cocoa foot mat was placed at the door. A special painting scheme was adopted, as mentioned below.

During the year twenty-five city converted one-man cars were also put through the shops and modernized. Each was equipped with treadle step control for the rear-exit door. This not only allows faster movement of passengers on crosstown lines, but is of particular advantage in Fort Worth because it can be used by negroes, who are required by law to occupy the rear seats of the cars.

To eliminate any possible danger of a passenger having his arm caught in the door after he has alighted from the step while still holding onto the post inside, the rubber tubing, used as a door edging, was replaced by two folded strips of sheet rubber, one screwed to the door and one to the post. The width of these strips is such that an obstruction like a human arm, up to a diameter of 2½ in., may be pulled out from between the soft rubber edges without injury. One car was equipped with a device which will reverse the door engine and open the door if there is any obstruction to prevent full closing.

The floors of the city cars were recovered with green cork linoleum with aluminum edging around the trap doors and at the car doors. All interior metal fixtures were nickel plated and the original side lighting was replaced by square base dome light fixtures. The seats on four cars were replaced by divided spring-backed, deep-spring edge, cushioned Walkover seats, upholstered in genuine brown leather. Other seats were covered with imitation leather of the same color with an additional roll of cotton along the front edge of the cushion and a seam in the center of the back to give the effect of a bucket type seat. In their finish five city cars were painted on the outside with a combination color scheme having a pennant design on the end. The colors used on these cars varied somewhat, being, for the roof, gray and buff; for the letterboard, yellow and ivory; for the window rails, blue, red, gray and brown, and for the body panels, gray and maroon, brown and blue, brown and maroon, gray and brown. The sash in all the cars was painted ivory.



Ford motor-driven cars at the "Plaza Principal" in Merida

Mexican Street Cars Are Powered With Automobile Motors

By Terrell Croft
Consulting Engineer, Merida, Yucatan, Mexico

IN MERIDA, Yucatan, Mexico, the Compañia de Tranvias de Merida S.A. operates, on twelve different routes, an extensive street traction transportation system. Its cars, built by the company and in its own shops, are all driven by standard Ford automobile motors. Merida is practically level. Because of this, the standard Ford motor, with a nominal rating of 22½ hp., has sufficient power to propel the cars effectively. On lines having grades the power of this motor would be insufficient for successful operation. Cars of this same construction, which were built in Merida, are operated by the traction systems of the Mexican cities of Progreso, Campeche, Laguna, Toluca and Puebla.

Classified as to mechanical construction, the cars are of two distinct types: (a) One end with single control, (b) double end with double control. Both open and closed car bodies are used. Either type is adaptable for mounting on a single-control or a double-control chassis.

Standard Ford parts are used, wherever feasible, in adapting the Ford equipment. The motor is not altered. The auto frame is suspended from the wooden frame of the car by forged iron hangers. The motor is hung in the steel frame by the Ford hangers just as if it were in a touring car or truck. The rear axle housing of the Ford car is shortened equally on both sides. The two axles are also similarly shortened; new keyways are cut in their ends and new specially designed sprockets are keyed on, one on each axle. Then a link belt chain drive is arranged from each of these driving sprockets to driven sprockets which are keyed on the car wheel axle.

Differentials of three types are used, the Ford touring car differential, the Ford worm-drive truck differential and the "Eli" differential. For street car driving the third has proved by far the most satisfactory. The sprocket-wheel ratio employed with a differential of each of these types is shown in the accompanying table. Slack in the chains can be taken up by tightening the turnbuckles in the truss rods which hold the rear-wheel journal housings in position. These housings are free to slide horizontally under the car-frame timber which they support.



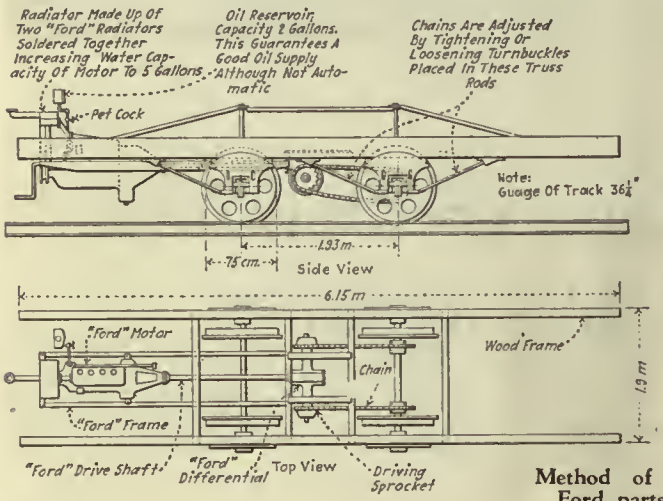
One of the first single-end control cars built in the shops of the Compañia de Tranvias de Merida

The control columns are mounted vertically at the end of the car. The gas and spark lever rods extend down through the column and through the floor of the car and are linked to the carburetor and Bosch magneto respectively. For convenience of handling, the positions of the spark and gas levers are reversed

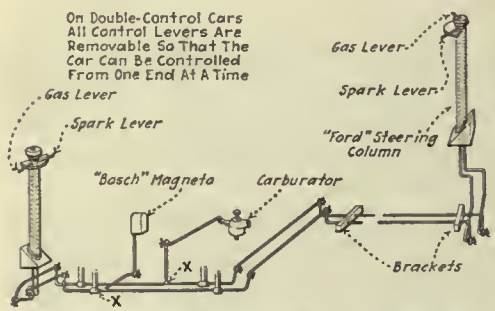
SPROCKET RATIOS USED WITH THE VARIOUS DIFFERENTIALS

Type of Differential	Number of Teeth in Small Sprocket	Number of Teeth in Large Sprocket
Touring	20	30
Worm-drive truck	28	30
Eli	15	30

with respect to each other from the positions which they normally occupy in an automobile. On single-control cars there is but one control column and the standard Ford steering column is used for it. On double-control cars there are two control columns and the spark and gas levers are made removable so that the car can be controlled from but one end at a time. Iron pipes, instead of the Ford steering column, are used in double-control cars to permit this arrangement. On all cars the Ford magneto is used only for the headlight. A Bosch magneto is used for ignition.



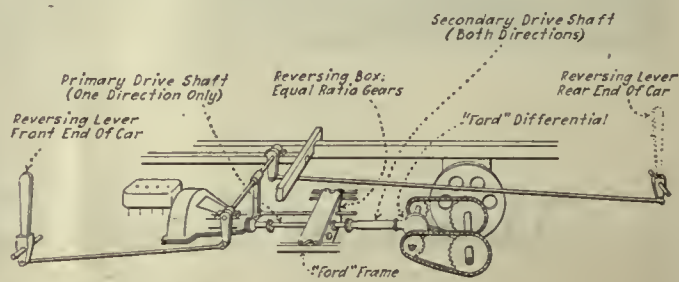
Method of coupling Ford parts to driving wheels



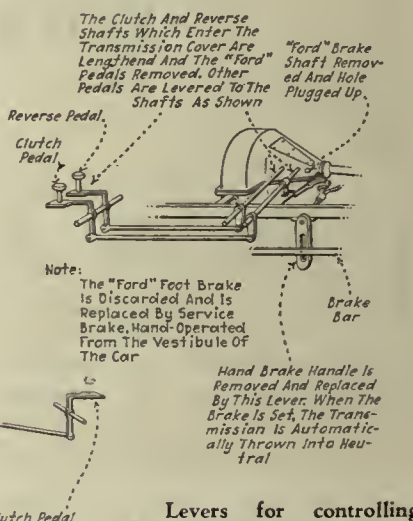
Modification of ignition and gas controls for double-control cars. For single-control cars only levers to left of point X are used

The Ford foot brake is replaced by a hand-operated brake, the hand wheel of which presses shoes against the wheels.

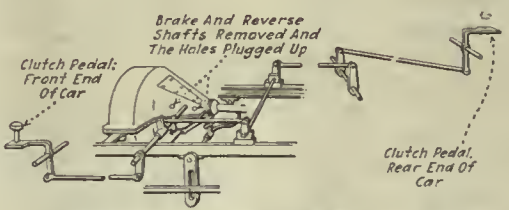
Manipulation of these cars is practically the same as that of a Ford automobile. On the single-control cars the clutch and reverse are operated by removable pedals in the floor of the vestibule. The stems of these pedals extend through the floor. The clutch and reverse shafts of the Ford motor, which enter the transmission cover, are lengthened and connected to the clutch and reverse pedals by lever arms and links. The Ford foot brake being discarded, the hole for it in the transmission cover is plugged. The Ford hand brake is removed from its shaft and replaced by a slotted wrought iron bar which hangs downward. A pin in the brake bar engages in the slot in the bar. When the motorman sets the brake, by turning the brake wheel in the vestibule, the transmission is thrown into neutral automatically.



Method used for reversing double-control cars



Levers for controlling clutch and reverse on single-control cars



Arrangement of levers for controlling clutch on double-control cars. Ford reverse has been discarded

It has been found that a single Ford radiator has insufficient capacity for cooling the circulating water. Hence for this service a single radiator unit is made of two standard Ford radiators soldered together back to back. This increases the water capacity of the cooling system on each car to 19 liters. The Ford gasoline tank is installed either horizontally under a car seat or vertically in the vestibule. The vertical setting has proved to be the best. The gasoline capacity of each tank is 38 liters.

An 8-liter oil reservoir is mounted in the vestibule of each car. A pipe runs from this reservoir to the motor and a petcock is installed in the pipe. This oiling system is not automatic, but is effective in that it permits the carrying of an ample supply of lubricating oil on the car.

On the double-control cars the clutch is operated by the same mechanism as that employed on the single-control cars. The Ford reversing mechanism is discarded and the hole which was provided for it in the transmission cover is plugged up. It is replaced by a reversing box mounted in the driveshaft, which contains a system of

OIL AND GASOLINE CONSUMPTIONS AND SPEEDS

Type of Differential	Maximum Speed in Kilometers Per Hour	Gasoline Consumption in Kilometers Per Liter	Oil Consumption in Kilometers Per Liter
Touring	40	4.00	36
Worm-drive truck	32	3.74	24
Eli	55	5.33	72

gears by which the rotational motion transmitted to the driving wheels is reversed. This reversing lever, which when in use extends up through the floor of the car, is removable to prevent its being tampered with by unauthorized persons.

Gasoline and oil consumption are very satisfactory considering the adverse conditions under which any cars in traction service must operate. Approximate figures are given in an accompanying table. The speeds which are tabulated are the approximate maximum speeds obtainable on straight, level tracks with normal load, that is with every car seat filled but without any standing passengers.

Without passengers, each car weighs approximately 3½ tons. Open-body cars seat 24 passengers, closed-body cars 20 passengers. Of 37 cars in operation 35 are single-control and two double-control. In the future only double-control cars will be built and operated because they have proved to be more efficient in operation than those which have only single control; they do not require a loop or "Y" in the track at the end of the line and have the advantage of being operable at high speed in reverse.



Control column and gear-shift pedals in one of the single-end control cars



Control column and gear-shift pedals in a double-end control car

The cost of a car complete is something between 4,500 and 5,000 Mexican pesos ($2,250 and $2,500). A car will operate approximately 8,500 km. between regular carhouse overhaulings.

All constructing and repairing are done in the shop of the company. There are no machine tools except a hand-operated drill press; all work is done by the blacksmiths, carpenters, trimmers, painters and motor mechanics. They turn out an admirable product. In view of their producing it with practically no mechanical equipment, they are deserving of commendation. Four blacksmiths, four painters, twelve machinists and twelve carpenters are employed. Of these 32 workers, fifteen are apprentices who serve without pay.

New Ford motors and parts are used in constructing the cars. Electric storage battery cars were tried in Merida, but their high operating cost rendered their adoption impracticable. The gage of the track is 92 cm. All of the methods and adaptations as described were developed under the direction of Tomas Salazar, V, master mechanic for the company.

Reduction of Fire Hazards in St. Louis Brings Reduced Premiums

SEVERAL interesting features of its practices are disclosed in the brief submitted by the United Railways of St. Louis for the 1927 Coffin Prize. One of these relates to a campaign it has been conducting to reduce the fire hazards on its property. An account of some of the more unusual steps taken follow:

In the oil storage room at both power plants an automatic steam smothering system was installed to extinguish oil fires. The equipment comprises a system of piping suspended from the ceiling of the oil room and connected to a high-pressure steam line with a control valve outside of the oil storage room. Grinnell Company jumbo sprinkler heads, specially adopted for use with high-pressure steam, were connected in the overhead lines at various points and serve to permit the escape of steam when a fire occurs. The resultant rise in temperature in the room is sufficient to fuse the link and unseat the valve in the sprinkler head. The smothering effect of steam in extinguishing oil fires when the oil is stored in a confined area is considered one of the most positive methods known and to be by far the most economical method where steam is easily available, as it is in power plants.

On the roof of one of the power houses an automatic aero central-station fire-alarm system was installed to indicate the presence of fire in the motor houses and beneath the wood decking surrounding the condensing equipment. This system utilizes the principle of expansion under heat of air contained in small tubing, which is installed along ceilings and walls in the power station and leads at each end to a diaphragm in a detector unit. The expansion of air in the tubing causes one or both diaphragms to close an electric circuit, thereby actuating a signal system through transmitter and relays.

The system is connected through a local alarm gong in the engine room and also in the office of the Missouri District Telegraph Company, and in the event of a fire both places receive a signal simultaneously. The central-station company dispatches the fire department upon receiving the signal. The system is exceedingly sensitive and indicates the occurrence of a fire in many cases in a fraction of a minute. It operates only on a rapid increase in temperature and is not affected by ordinary and gradual changes in temperature.

The coal storage building in this same power station is five stories in height and of the mill construction type. The coal from it is conveyed by way of an overhead bridge to the coal bunkers of the power house. The building is separated from the power house proper by a public street 60 ft. wide and three sides of it are exposed to fire hazards from adjoining property. To protect against these exposures a manually controlled water curtain was installed, divided into sections, and consisting of a system of piping arranged in lines and supported along the outside faces of the building. Open sprinkler

heads are spaced at intervals along the piping. Each section is connected through a main to a central header with valve control at the header for each section. The water supply is from city mains at 80-lb. pressure, with steamer connections for fire department pumpers.

In addition to these methods of protection many others have been introduced in the power stations, shops and carhouses, with the result of a considerable saving in insurance premiums. In 1922 the railway company's property was covered by fire insurance in the amount of $11,754,100 and paid premiums totaling $66,223.44, whereas in 1926 the coverage was $12,684,800 and the premiums amounted to $44,603.84. In other words, although the coverage was increased almost 8 per cent, the premiums paid were reduced 32.5 per cent.

Track Rehabilitated in Place

THE way in which approximately 10,000 ft. of track in El Paso which had become in bad shape because of defective paving was rehabilitated forms an interesting part of the company's brief submitted in competition for the Coffin 1927 prize.

The rail in this track was in fair condition except at some of the joints, but it was found that a great many of the fastenings which held the rail to the steel ties had been completely destroyed by rust. In fact, for practically the entire length of the section the rails simply rested loosely on top of the ties. Rehabilitation of this track consisted of the removal of the old bitulithic paving, welding of the rail base to every tie, welding and grinding of all joints and resurfacing the track area.

The most difficult problem was probably to repair the defective joints. At each joint the concrete was broken out over an area 30 in. square and the dirt was removed to a depth of at least 18 in. below the base of the rail. An 8-in. x 10-in. x 24-in. white oak block was then inserted under the joint and secured by four screw spikes. Ten inches of dry rich concrete was then tamped under the block with pneumatic tampers until no motion could be detected in the block or rail while cars were passing.

The old rail angle-plates, after a thorough cleaning and rebolting whenever necessary, were then welded and the battered rail ends built up and ground. The sides of the rails were gone over thoroughly with a scaling tool especially designed by the company.

The total combined cost for excavation, track repairs and paving replacements was only about $2.65 per foot of track. Arc welding machines, compressed air tools



Signs like this help the public in El Paso to realize the cost of track reconstruction

and other labor-saving machinery enabled the company to cut the cost of this job practically in half as compared with hand work. Moreover, complete reconstruction of the track would have been necessary had the work not been done promptly. The cost of such reconstruction, including new rails and concrete base, would probably have been about $11 per foot. The work was carried on without any interruption of street car service and practically without disturbance to vehicular traffic.

The result of this undertaking has been to save the major portion of the original investment in the track and to prolong its life by at least fifteen years.

Monthly Labor Review Quotes From Journal's Article

IN CONNECTION with a discussion of industrial relations and labor conditions, the October issue of the *Monthly Labor Review* of the Bureau of Labor Statistics, United States Department of Labor, contains an extended abstract of the article entitled "Labor Conditions on European Local Transportation Systems," by Henry W. Blake, which appeared in the Aug. 27 issue of this JOURNAL, page 351. The portions of this article featured in the Labor Bureau's publication are those relating to methods of examining applicants for employment on European street railway and bus systems, and on the systems of providing housing for street railway employees followed on several European properties.





The rail shown in the view at the left was in good condition, but had parted from its ties when the steel fastenings had rusted away. The completed track, which was rehabilitated without disturbing car traffic, is shown in the right-hand view



General view of Virginian locomotive maintenance shops. The sanders may be seen in the foreground

Locomotive Maintenance Shop
of the Virginian Railway

A modern repair shop has been recently put into operation at Mullens, W. Va., to care for 36 locomotives on the electrified division

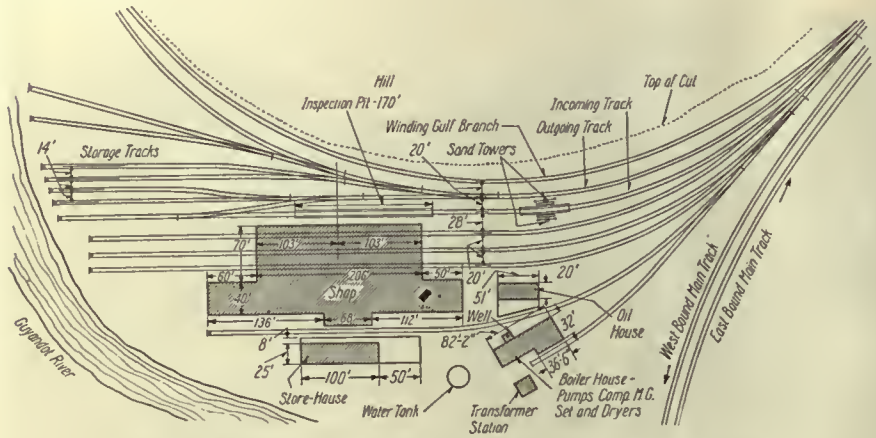
By Allen McLanahan
Service Engineer Westinghouse Electric & Manufacturing Company

IN CONNECTION with the electrification of 134 route-miles of track from Mullens, W. Va., to Roanoke, Va., complete service on which was inaugurated in 1926, the Virginian Railway has erected a new modern shop for the maintenance and repair of electric locomotives. This is one of the few instances that a complete new plant, designed for the purpose, has been constructed in connection with an electrification. This electrification, contract for which was awarded to the Westinghouse company in 1923, included 36 motive power units of 215 tons each. Normally three units comprise a locomotive, so that shop facilities had to be provided to care for locomotives measuring more than 150 ft. in length.

In considering the proper location for the electric shop it was desired that it should be not only the repair point, but as far as possible should be the turning point for all locomotives. Since certain locomotives operate only at the western end of the electrification, on Clark's Gap hill, the shop was located at Mullens, which is the western end of the electrified zone. All engines now operate out of Mullens and the necessity of maintaining a stock of spare parts at several points is eliminated. The only additional shop facilities required are those for making the inspection and running repairs to locomotives at Roanoke after their eastbound trip.

The plant includes the shop building, a storehouse, an oil house, a building for the substation and steam heating boiler, a water tank, sanding towers, an outside inspection pit and locomotive storage tracks. As all the tracks outside the shop are electrified, there is no need for a steam locomotive to move the electric units.

On arrival from the road a locomotive passes between the sand towers, where the sand boxes and rheostat



Plan of general layout of Virginian locomotive inspection shops

fresh water tanks are filled and the running gear washed. The locomotive is then moved along the same track to the inspection pit, where it receives a complete mechanical and electrical inspection. The trolley wire over this pit is equipped with a disconnecting and grounding switch so that the inspection of the pantographs and roofs can be made in safety. After inspection the locomotive is put on one of the storage tracks until it is again called. If repairs are to be made, however, it is pushed into the shop by another electric locomotive.

The water for shop purposes and for use in the liquid rheostats is obtained from a well located under the sub-station building. A deep well pump supplies this water to the 125,000-gal. storage tank, from which it is piped to the shop and yard. For fire protection a motor-driven fire pump supplies water at high pressure to a pipe line to which fire hydrants are connected at convenient points in the shop yard.

The Shop Has Two Main Bays

The main shop building has two bays and a wing which contains the carpenter shop, bake ovens and dip tank. The first bay or inspection building is 206 ft. long and 70 ft. wide and contains three pit tracks, each long enough for a complete locomotive. Each pit has a jacking shelf and is equipped with permanent lights, receptacles for portable lamps and piping for compressed air. There is a drop pit with a portable hydraulic jack near each end of these tracks so that six points have been provided for dropping wheels and engine trucks. This bay is served by a 30-ton electric crane. A gallery has been provided along the outside track at the height of a locomotive roof for use in connection with pantograph or other roof work.

The second bay contains the tool room, air-brake room, machine and blacksmith shops, winding room, electrical repair spaces, locker and wash-rooms and the offices. This bay is served by a 15-ton electric crane, operated from the floor.

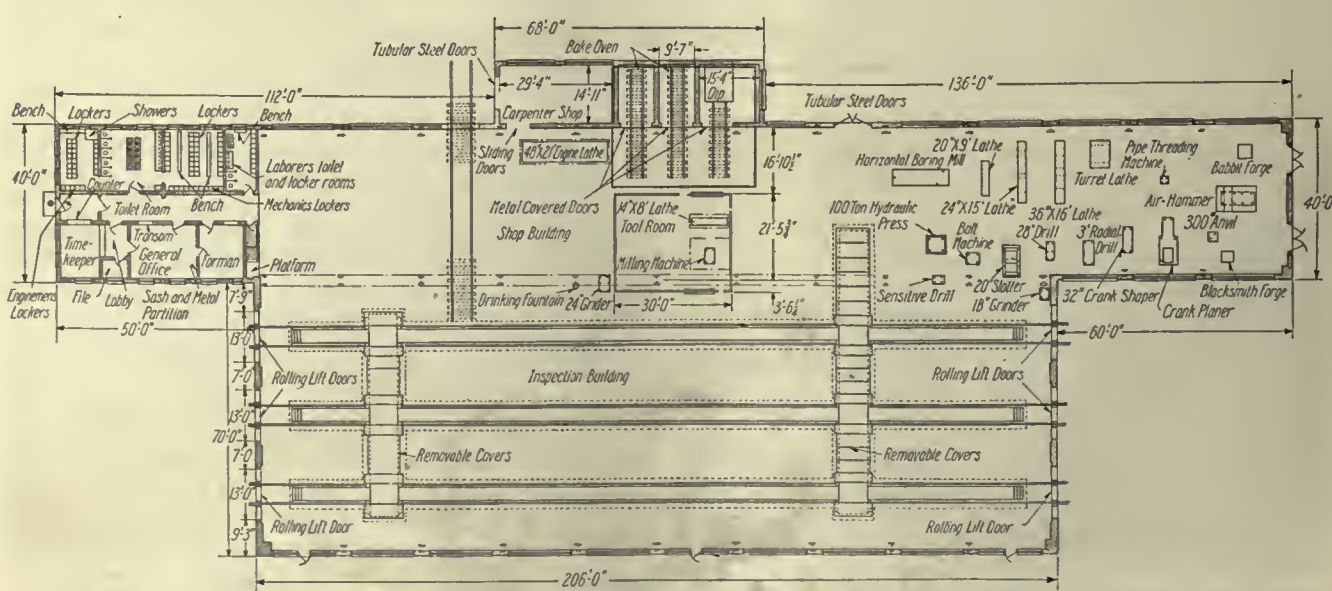
The floor of the whole shop consists of 2-in. treated oak planks laid on sills set in crusher dust. The shop is heated by an indirect unit system, each unit consisting of a steam radiator, electric blower fan and air piping. The ceiling is painted white, and plenty of lamps give excellent illumination at night in all parts of the shop.

The whole shop is piped for compressed air and outlets are located at convenient points for connecting portable lamps, the insulation testing outfit and a portable arc welding set. There is a 32-volt alternating-current circuit, by means of which current can be supplied to the locomotive lamps without using the batteries or energizing the locomotive. This arrangement is of great assistance.

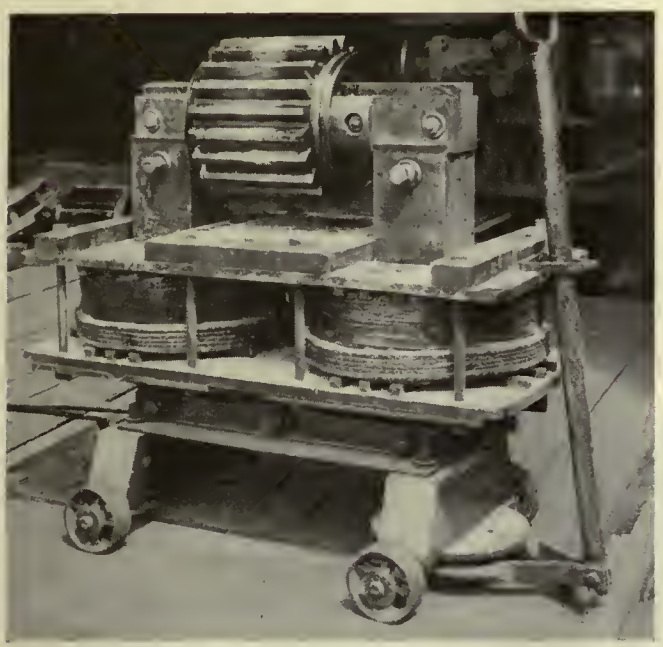
The machine shop contains the following machine tools, each of which has individual motor drive:

84 in. engine lathe
30 in. engine lathe
24 in. engine lathe
18 in. engine lathe
60 in. universal (horizontal) boring mill
32 in. crank planer with 40-in. stroke
48 in. vertical turret lathe
32 in. shaper
20 in. slotter, 26-in. stroke
36 in. radial drill press
28 in. vertical drill press
18 in. vertical drill press
4 in. pipe cutting machine
Bolt machine

In addition there are two electric grinders, a 100-ton air-operated bushing press and hand-operated sheet metal shears, roller and crimper. No tire-turning equipment or wheel press has been installed as it is intended that this work shall be done in the Princeton shops.



Plan of layout of inspection building



The portable electric pinion heater does the work quickly and accurately



The hydraulic pinion puller makes pinion removal an easy task

The 84-in. lathe is used for banding the large traction motor and phase-converter rotors and can be used for turning the journals of the driving wheels if necessary.

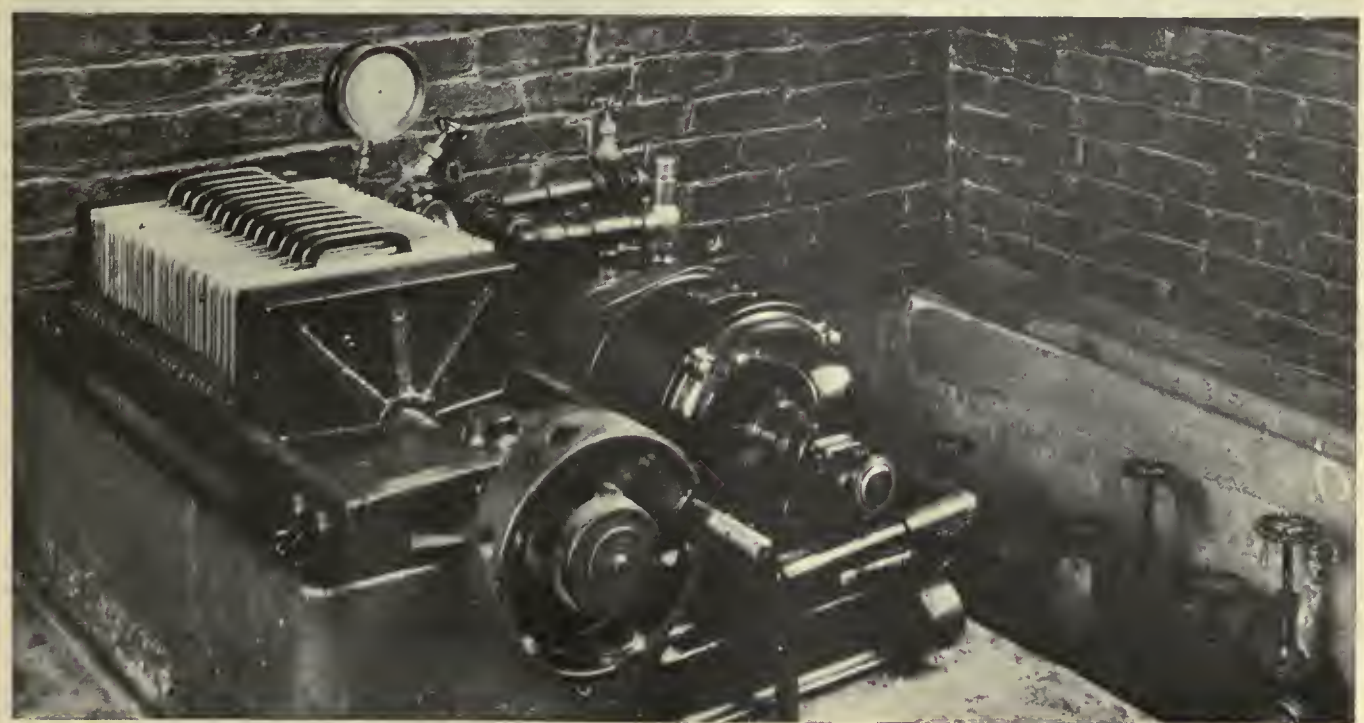
The tool room, located in the center of the shop, has the necessary shelves for tools and special equipment and contains a 14-in. engine lathe and a universal milling machine. The carpenter shop has a combination woodworking machine, which consists of band saw, planer, rip saw and wood lathe.

In the blacksmith shop are two forges, of which one is used for babbitting work. These are supplied with air from a motor-driven blower. For heavy work there is a 600-lb. air-operated hammer, the air being supplied by a motor-driven compressor which is integral with the hammer. An electric pyrometer for the babbitting furnace insures that the metal is poured at the proper temperature.

A separate room inclosed by a wire screen is used for the repair and testing of the air equipment. This room is fitted with benches, a test rack designed for testing the air-brake equipment used on the locomotives and a rack for testing magnet valves.

Offices for the timekeeper and crew dispatcher, the general foreman and the electrical foreman are on the ground floor. The washroom and toilet facilities are located across the hall from the offices, and there are three locker rooms for enginemen, white shopmen and colored shopmen. A shower bath is installed in the enginemen's locker room.

A gallery above the offices and locker rooms is used



Oil filter press and valves located in oil house

for the repair of light electrical equipment of the locomotives, such as switches, magnet valves, relays and brush-holders. Compressed air at 70 lb., as used in the control of the locomotives, is available at all benches.

A separate room for repairs to delicate relays and meters is equipped with a test table from which the various low currents and voltages for use in calibration may be obtained. Besides the locomotive meters the meters and relays from the substations and power plant will be repaired here. The gallery also contains a room that is used both as an office for the road foreman of engines and an instruction room for enginemen.

Two independent electric ovens especially designed by the Westinghouse Electric & Manufacturing Company for drying and baking the electrical apparatus are located in a wing of the main shop. They are built of heat insulating material, with a chamber above each oven equipped with a ventilating fan and dampers that provide a circulation of air through the oven during the drying. The oven temperature is automatically maintained between desired limits by means of a thermostat, and current is automatically cut off whenever the oven doors are opened. A record of the temperature is kept by Bristol recording thermometers. A voltmeter measures the insulation resistances of the pieces of apparatus that are being dried out without opening the oven doors.

In planning for the dip tank particular care was taken to minimize the fire risk due to the highly inflammable character of the insulating varnish. The tank is in a separate room with fireproof doors and a ventilating fan to exhaust the vapor into the outside air. An emergency tank of the same capacity as the dip tank is buried beneath it. In case of fire a valve may be opened from the outside which will allow the varnish to flow by gravity into the emergency tank and thus extinguish the fire. The varnish may be raised again to the dip tank by air pressure. The lid of the dip tank will automatically close by gravity in case of fire.

The storehouse building, 25 ft. x 100 ft., has a large platform for unloading material and for the storage of castings and other material that does not require protection from the weather. The interior is fitted with steel shelves for the storage of the various spare parts of the locomotives and other necessary material. It also contains an electrically operated water still which supplies all the distilled water required on the road.



All machine tools have individual motor drive

The oil house is a separate building with a large platform for barrels and boxes of grease. It is fitted with tanks for oils of which small quantities are used. Measuring pumps are connected to the underground tanks in which the large amounts of oil are kept. Here also is located an air-operated press for forming drive journal grease cakes and the grease sticks used in the main rods and for hubliner lubrication. At one end of this building is a separate room where lanterns, flags, engineers' tool boxes and other locomotive supplies are kept.

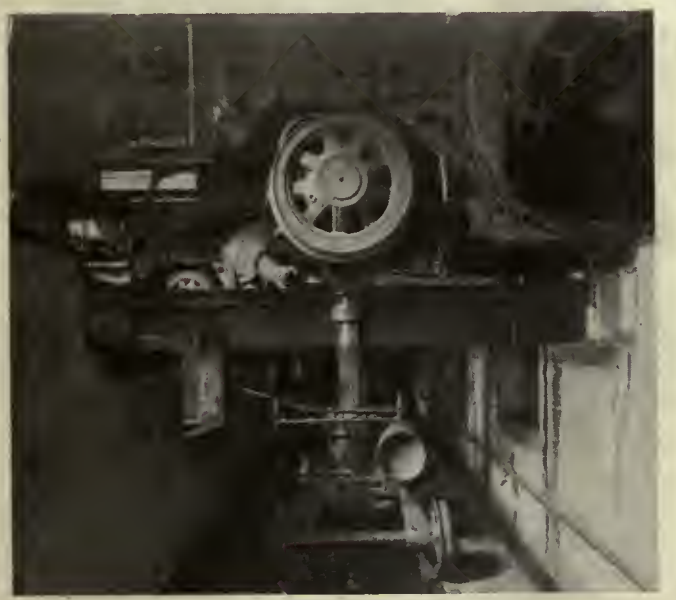
Substation

Two Westinghouse 200-kw., 250-volt, single-phase synchronous motor-generator sets supply the 250-volt direct current for operating all the shop machinery and the lights. Power for driving these sets, obtained from

the 11,000-volt trolley wires, is stepped down by two transformers, one for each machine, located in an outdoor substation. The sets are started by single-phase series motors, mounted on the common shaft, the transformers being arranged to give the reduced voltages required. Disconnecting switches make it possible to supply the transformers from either eastbound or westbound trolley.

The switchboard contains two a.c. motors, two d.c. generators and three d.c. feeder panels. The d.c. feeder lines run to distribution panels in the shop, where the fuses and switches for the various motors and lighting circuits are located.

The substation room also contains a single-stage, 12 x 10



There are six drop pits equipped with portable hydraulic jacks

air compressor that supplies the shop. In emergency, if the shop compressor fails, locomotive compressors may be connected to the shop air system.

Arrangements have been made for the purification of the oil used in the locomotive transformers by a Westinghouse oil-treating outfit, located in the substation room, two oil tanks buried in the ground and pipe lines to the shop. There are two of these lines, one for the clean and one for the dirty oil, each with three outlets on each side of the shop, properly spaced to take care of a three-unit locomotive. By means of a manifold and valves the dirty oil can be run down into one of the tanks and fresh oil pumped into the transformer, or the oil can be taken out through the filter into a tank and then passed through the filter back to the transformer. By this system the oil of all the transformers of a three-unit locomotive can be completely purified in one day. This piping is so arranged that the oil in the substation transformers can be passed through the same filter. Two additional tanks purify the oil used in the circuit breakers without mixing it with the transformer oil.

One end of the substation building is used for sand storage, a coal stove being used for drying. The dry sand is put into one of two drums, each connected to one of the two sanding towers, and raised to the towers by admitting air to the top of the drum. Each tower has three outlet pipes, spaced to accord with the openings of the locomotive sand boxes, so that a unit can be completely sanded without movement. As the sand box openings are on the outside of the cabs, no sand enters the equipment compartment.

Among the new features in this shop are the two portable electric pinion heaters of the induction type. The pinion becomes the secondary of a transformer and is heated by the current that passes through the primary. The locomotive pinions are heated more rapidly and uniformly than is possible in an oven, about 35 minutes being required to raise the temperature to 135 deg. C., at which temperature the pinions are placed on the traction motor shafts. While these heaters were primarily designed for pinions, they are used for heating bushings and other rings that are to be shrunk on.

The policy of using special tools and mandrels wherever desirable has been followed from the beginning. A large supply of these was obtained with the locomotives, and additional tools have been made as soon as they were seen to be of advantage.

Hazards from Spray Painting

IN AN article on hazards from spray painting in the monthly *Labor Review* for September, 1927, mention is made of the study being conducted on this subject by the Pennsylvania Department of Labor and Industry. Without ventilation and with lead paint, there was found to be a very decided lead hazard and also a hazard from the solvents and driers used in the paint. Where the spray painting is conducted in properly constructed cabinets and the ventilating equipment is placed so that the spray is not drawn past the operator's face, the process is considered safe, provided all the precautions used in other kinds of painting, such as strict personal cleanliness, protecting foods and street clothing from dust and spray, etc., are followed. Masks are considered impracticable.

With the quick-drying leadless paints, such as lithopone paint and those with a pyroxlin base, the hazard comes from benzol. With these also there should be good ventilation, with scrupulous cleanliness of workrooms and booths at all times. To prevent unnecessary liberation of solvent vapors as well as to decrease the fire risk, the materials containing volatile solvents should be kept covered or closed.

Still another hazard to be guarded against with the spray is the use of too great air pressure or pressure beyond that for which the tank is guaranteed. The report points out that there is fundamentally no excuse for this increased pressure, but that workmen whose air brushes become clogged may think this the easiest way to get good action. Two accidents from too great an increase in pressure are mentioned in the *Labor Review*.

St. Louis Builds Nine Concrete Loading Platforms

DURING the past year nine concrete passenger-loading platforms were installed at various locations along the car lines of the United Railways Company of St. Louis. These platforms were built jointly by the St. Louis School Board, the Police Department and the railway company. According to its Coffin contest brief, these platforms are 100 ft. long and 4 ft. 7 in. wide. A signal light on a concrete base is placed at the forward end of each platform and a concrete pedestal at the rear end of the platforms. The platforms have been found to contribute much to the safe landing of passengers where automobile traffic has been heavy.

Harvey L. Bullock

Wins Monthly Maintenance Prize for October

SPECIAL equipment for testing and regulating thermostats as used by the New York Central Railroad receives the $25 Monthly Prize for October in the ELECTRIC RAILWAY JOURNAL'S Maintenance Competition. Honorable mention was given to a machine for oiling track curves submitted by I. O. Mall of the New Orleans Public Service, Inc.



Harvey L. Bullock

IT IS extremely important that thermostats function properly in order to insure proper regulation of heat on cars. In general, too little thought has been given by electric railways toward maintaining thermostats in proper working condition. The most general practice is to install them on cars and then forget about them, assuming that if anything happens so that they do not operate properly, they will be reported by the transportation department.

A very ingenious device for testing and regulating thermostats as used by the New York Central Railroad at its White Plains, North Station, and as described by Harvey L. Bullock, general foreman of electrical equipment at those shops, provides an accurate means for testing and regulating the thermostats. The device is of very ingenious construction and shows much thought has been given to the problem of thermostat adjustment. It was described in the Oct. 20, 1927, issue of ELECTRIC RAILWAY JOURNAL.

A machine for oiling track curves, the description of which was submitted by I. O. Mall, assistant superintendent of roadway for the New Orleans Public Service, Inc., evidently has materially reduced the hazards to the curve greaser from vehicular traffic, as it enables him to give practically his entire attention to traffic conditions without detracting from the efficiency of the oiling operations. This device was awarded honorable mention by the judges for items published in the October maintenance issue. The saving in labor cost from the use of this device should commend its use to other properties.

MONTHLY MAINTENANCE CONTEST CONTINUES

Items continue to come in for the Maintenance Competition, and the ideas submitted are of a very high character. It is evident that the articles published so far are just combing the surface, for in the items submitted there is no duplication and it appears that there is a very broad field for the improvement of maintenance practices and equipment. Twelve articles were published in the Maintenance Data Sheet section of ELECTRIC RAILWAY JOURNAL for Oct. 20, 1927. Additional items appear in the following pages. One of these will be awarded the $25 monthly prize for November. Results of the contest each month are awaited eagerly by a large number of readers.

Following are the conditions of the contest:

1. Any employee of an electric railway or bus subsidiary may compete.

2. The author does not need to be the originator of the idea.

3. Articles may be submitted by several persons or by a department.

4. Any maintenance practice or device for electric railway or bus repairs may be the subject.

5. Articles should be 100 to 200 words long with one illustration, and in no event longer than 400 words with two illustrations.

THE winner of the monthly prize for October in ELECTRIC RAILWAY JOURNAL'S Maintenance Contest is general foreman of electric equipment in the shops of the New York Central Railroad at White Plains, North Station. He has served in this capacity since 1908, and during this period has initiated many improvements in mechanical and electrical devices pertaining to multiple-unit cars and locomotives. He has also made improvements in maintenance and shop practices. Mr. Bullock began his electric railway experience as electrician for the Schenectady Railway and later was promoted to carhouse foreman. He also worked for the General Electric Company at Schenectady in the construction department on electric locomotives. At that time the bipolar type ordered by the New York Central Railroad was being equipped and upon the electrification of the Grand Central Terminal, Mr. Bullock was transferred to that point in 1906 as foreman in charge of multiple-unit cars and electric locomotives for the Harlem Division. Mr. Bullock was born in Cohoes, N. Y., 45 years ago.

---

6. Illustration material may be in the form of drawings, sketches, blueprints or photographs. All sheets should be marked "Maintenance Competition."

7. Manuscripts should be mailed to the editor of ELECTRIC RAILWAY JOURNAL, Tenth Avenue at 36th Street, New York.

8. A prize of $25 will be awarded each month for the best maintenance idea in the group published. A minimum of $5 will be paid for each article accepted for publication. Manuscripts will be received until April 30, 1928.

9. Announcement of the winner each month will be made in the issue devoted to maintenance and construction (the third issue each month) following the one containing the item.

10. Additional details were given in ELECTRIC RAILWAY JOURNAL for April 16, pages 700-701.

Electric Railway Journal Maintenance Data Sheet

ROLLING STOCK—TRUCKS—16

Grease Cups Lubricate Side Bearings*

By H. A. Albin
Superintendent Lancaster, Ephrata & Lebanon Street Railway, Lebanon, Pa.

PROPER lubrication of truck side bearings has proved somewhat tedious and thus is often neglected or put off. The most common practice is to jack up one corner of the car and apply the lubricant with a grease gun or swab. This, at best, is a slow method and ofttimes more grease is placed outside of the bearing than on the surfaces where it is needed.

Where a railway has many curves, side bearings should be greased periodically so that the trucks will swivel easily and save wear of both wheel flanges and the rail. On the Lancaster, Ephrata & Lebanon Street Railway a simple plan has been devised. A hole is drilled in the lower side bearing plate and tapped for a ¼-in. pipe. A short nipple is inserted with an elbow pointing toward the outside of the car. Another nipple 2 in. or 3 in. long with a good-sized grease cup is screwed to the elbow.



The head of the grease cup is marked "X" in the above illustration

The grease cup can be reached easily from the side of the car and can be filled with regular side bearing lubricant. It can be given a turn easily and quickly at periodical intervals and the grease is thus forced directly where it is needed without wasting any of it.

This method saves time, trouble and grease and does away with the necessity for jacking up the car body. It has proved very inexpensive and effective. With a little practice the amount of turning of the grease cup to furnish proper lubrication can be gaged easily.

*Submitted in Electric Railway Journal Prize Contest.

Electric Railway Journal Maintenance Data Sheet

ROLLING STOCK—ELECTRICAL—29

Tightening Controller Cylinder Castings*

By R. T. Chiles
Master Mechanic Cumberland County Power & Light Company, Portland, Me.

CONSIDERABLE trouble has been experienced on our property from loose controller cylinder castings with K6 and K28 controllers, which have round shafts. To overcome the trouble without going to the expense of buying new cylinders with hexagonal shafts, a $\frac{13}{64}$-in. hole was drilled through the casting, insulation and shaft. A $\frac{5}{16}$-in. diameter round hard fiber pin was then driven into the hole. Three of these pins were put in the upper cylinder casting, two in the center casting and two in the lower casting. This method of tightening the castings and insulation has proved entirely satisfactory and has been done at a very low cost. In carrying out the work care must be taken to drill accurately through the center of the shaft and the hole must be cleaned out carefully of drillings and other metal particles to remove any chance of later having a grounded cylinder.



K6 controller cylinder with tightened casting

*Submitted in Electric Railway Journal Prize Contest.

Electric Railway Journal Maintenance Data Sheet

ROLLING STOCK—TRUCKS—17

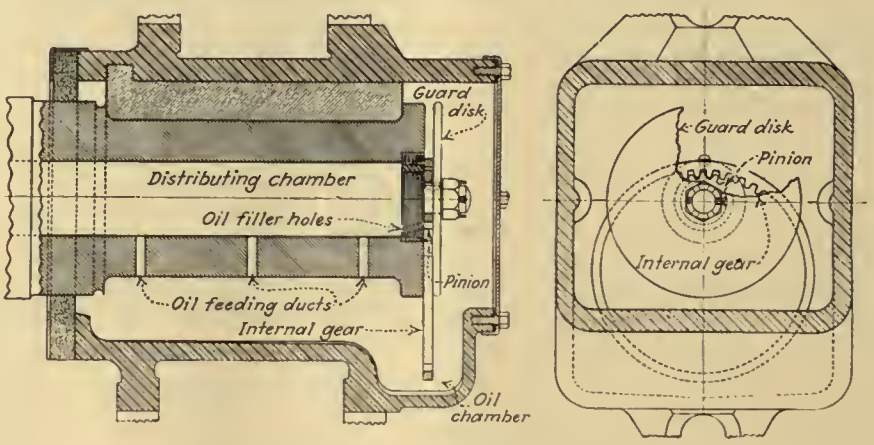
Splash Lubrication for Journal Bearings*

By H. S. Williams
Assistant Superintendent of Equipment,
Department of Street Railways, Detroit, Mich.

In an effort to improve journal bearing lubrication, the system shown in the accompanying drawing has been developed. This provides for flood lubrication of the bearing surfaces and its efficiency in service is proved by the fact that heat tests show a bearing temperature rise of 19 deg. F. with the new method as compared with the 33 deg. F. rise with the standard oil and waste lubrication system. In addition, the journal box construction makes it dust-tight.

The outer end of the journal is supplied with a small spur pinion over which runs an internal gear of large enough diameter to reach nearly to the bottom of the journal box. This internal gear is held in place by a guard disk that is held outside the pinion. The interior of the journal is hollowed out to provide an oil distributing chamber. This reservoir is supplied with oil through filler holes drilled from the root of the pinion teeth into the distributing chamber. Oil is fed to the underside of the bearings through holes drilled radially into the distributing chamber.

The operation consists of picking up oil from the journal box by the internal gear, which carries it to and forces it through the filler holes into the distributing chamber, from which it is fed by centrifugal force to the bearing surface. An oil-throwing ring is provided on the journal to prevent oil being carried out through the dust guard.



Flood lubrication system for journal bearing

*Submitted in Electric Railway Journal Prize Contest.

Electric Railway Journal Maintenance Data Sheet

ROLLING STOCK—ELECTRICAL—30

Better Support for Armature Leads Decreases Breakage*

By M. S. Walker
Armature Winder Beaver Valley Traction Company,
New Brunswick, Pa.

Considerable difficulty from breaking of armature leads back of the commutator on high-speed interpole motors has been experienced by the Beaver Valley Traction Company, New Brunswick, Pa. By disconnecting the armature leads carefully it was found that there was a slight breathing movement of the coils at the front end of the diamond. This was found to be due to the drying out of the coil.

When in service the continual movement of the armature coils had a tendency to move them upward against the top leads, and in time these would break off back of the commutator neck.

To overcome this condition three layers of friction tape and two layers of oil linen tape, together with one layer of 0.012 in. fish paper, were placed over the diamond and the entire assembly was then wound with a 1⅛-in. steel band of No. 17 wire. This was soldered securely. Four layers of friction tape and three layers of oil linen tape were then placed over the bands and connected to the top leads. This method has been used for the past two years and has proved very effective.

*Submitted in Electric Railway Journal Prize Contest.

Electric Railway Journal Maintenance Data Sheet

ROLLING STOCK—MISCELLANEOUS—14

Electrical Connections for Supplying Power to Run Out Trucks and Return Them to Cars*

By Charlie Herms
General Foreman San Diego Electric Railway, San Diego, Cal.

THE attached diagram shows a simple and convenient method for supplying power to the motors on trucks of electric cars to run them out from under the car bodies and return them after overhauling. This has been found a great time and labor saver in the shops of the San Diego Electric Railway over the old method used of pushing the trucks by hand. Previously four men were required, while with the electrical method the regular overhauling crew of two men handle the job with ease and lose little time.

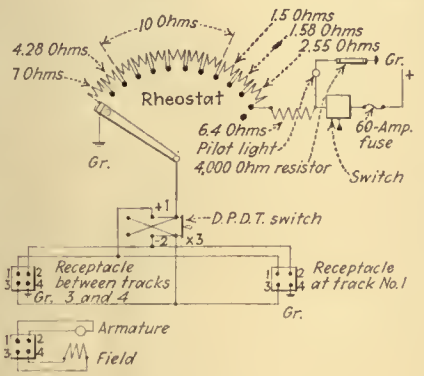


Diagram Showing Jumper Connecting Motor to Receptacle

By means of plug connections the car motors are used to run the trucks out and return them under their own power

Our shop has plug-in receptacles mounted conveniently alongside the overhauling tracks. Motor leads are equipped with standard knuckle-joint connectors and these are marked to correspond with the field and armature leads, and so eliminate wrong connections. The male end of the four-conductor plugs is also provided with a guide so that it cannot be wrongly inserted. In removing a truck one man operates the rheostat while the other spots the truck in its location.

A double-pole, double-throw knife switch is mounted at the rheostat for reversing the motor current. A red pilot light is also mounted in plain view so as to warn the shop men when the switch is closed.

In the diagram of connections it will be seen that a shunt method of control is used. This was found of advantage in that very fine regulation is provided which does not require as much resistance as would be necessary with a series method. Also with the shunt method a part of the resistance is connected permanently between the line and the rheostat to safeguard against flashover.

*Submitted in Electric Railway Journal Prize Contest.

Electric Railway Journal Maintenance Data Sheet

TRACK AND WAY DEPARTMENT—12

Special Work Frogs for Quick Repairs*

By Louis T. Botto
Superintendent Maintenance of Way San Antonio Public Service Company
San Antonio, Tex.

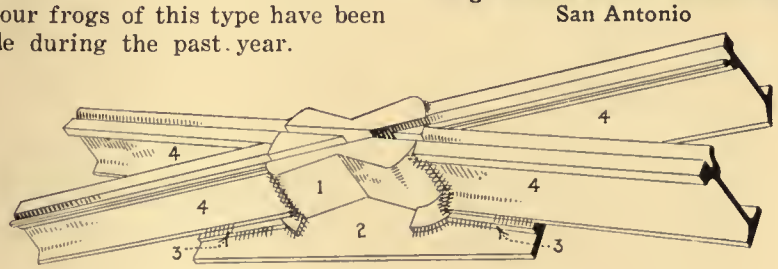
USUALLY it takes from six to eight weeks to get a special work frog made at a factory in the North or East and delivered to our railway in San Antonio. When a frog breaks in service it should be replaced immediately, and to meet such conditions a cast-steel casting has been developed which is used in conjunction with steel plates and regular 105-lb. and 110-lb. rails in fabricating special work frogs.

The casting is designed so that any angle frog, either straight or curved, can be made up in two or three days by a welder and two helpers. Electric welding is used for fastening the bottom of the casting to the first plate and for welding the two plates to each other. Acetylene welding is used in fastening the rails to the castings and plates. After the welding operations are completed the flangeways through the castings are marked out with an acetylene torch and are then ground out true to line with an Atlas rail grinder and set.

Four frogs of this type have been made during the past year.



Frogs installed on Goliad Street, San Antonio



1, Frog casting
2, ½"x2'x4' Plate
3, ⅝" Plate to go under base of rails
4, 105 lb. or 110 lb. Groove rail any required length or curve

////////. Electric spot welds

Rails 4 welded to casting 1 with acetylene welding torch

Construction used for making frogs

*Submitted in Electric Railway Journal Prize Contest.

Electric Railway Journal Maintenance Data Sheet

ROLLING STOCK—MISCELLANEOUS—15

Jack Extension Eliminates Blocking*

By Edwin C. Kelly
Shop Foreman Virginia Public Service Company, Hampton, Va.

AN EXTENSION of suitable length welded to the stem of an ordinary ratchet jack has proved a very handy device in the shops of the Virginia Public Service Company, Hampton, Va. This is used in pits where minor repairs and inspections are made. When changing axle bearings, motor supension springs and on similar jobs where the use of a jack is necessary it may be placed in position quickly without blocking and the required height obtained without occupying unnecessary space. When placed in position it does not interfere with the movements of the workman.



Jack with extension arm in pit of the Virginia Public Service Company

Submitted in Electric Railway Journal Prize Contest.

Electric Railway Journal Maintenance Data Sheet

TRACK AND WAY DEPARTMENT—13

High Carbon Steel Used for Repairing Track Tools*

By F. C. Womack
Engineer Maintenance of Way, Virginia Electric & Power Company, Richmond, Va.

CONSIDERABLE saving results in the repair of maintenance of way tools used by the Virginia Electric & Power Company by electric welding high-carbon steel to the points that are subjected to abrasive wear. The accompanying illustration shows a pneumatic tie-tamping tool before and after repairs are made. The view on the left shows the tool after about a week's use. The center illustration shows the tool after it has been built up with high-carbon steel and the view at the right is of the tool after it has been dressed up on an emery wheel. By this method tools retain their shape from four to five times as long as they do when repaired by the blacksmith.



At left, the tool before repairs. In center, built up with carbon steel. At right, after finishing on emery wheel

Submitted in Electric Railway Journal Prize Contest.

5 out of 7

Regularly use "TOOL STEEL" Gears and Pinions

In the Electric Railway Journal, Maintenance Competition, May 21, 1927, seven articles were submitted from men in Philadelphia, Chattanooga, Atlanta, Washington, New Orleans, Birmingham, and Portland, Maine. Presumably these companies are alert in an effort to keep down maintenance costs.

5 out of 7 of these companies regularly use "Tool Steel" gears and pinions,

and

3 of the 7 companies, when buying new equipment, have specified "Tool Steel" gears and pinions on their new motors.

also

In the April contest (April 16th issue of Electric Railway Journal) 5 out of 6 were submitted by "Tool Steel" gear and pinion regular users.

"Tool Steel" gears and pinions reduce maintenance costs; if you take almost any classification of the "Live Wires" in the industry you will find that the great majority keep down their maintenance costs with "Tool Steel" gearing.

The Tool Steel Gear & Pinion Co.
CINCINNATI, OHIO

Here's the monthly record of Total rolling Stock Articles and users of "Tool Steel" gears

April	5	out of	6
May	5	out of	7
June	7	out of	8
July	4	out of	5
Aug.	6	out of	8
Total	27	out of	34

79%

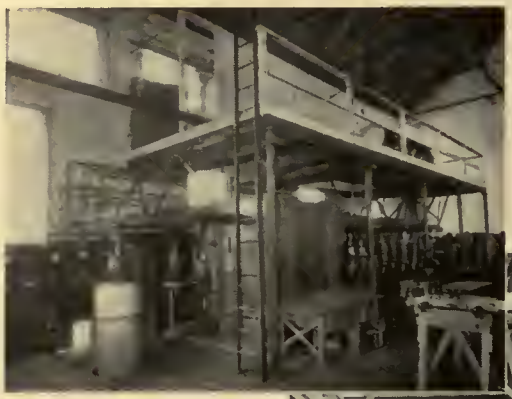
Out of 34 Contestant articles, 27 came from Companies regularly using "Tool Steel" Gears and Pinions

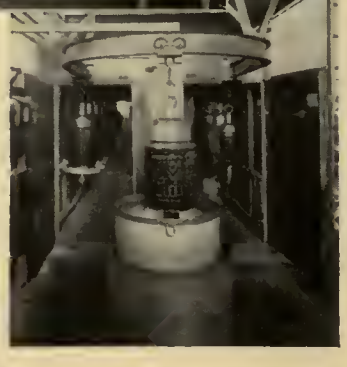


THE FIRST CAPITAL PRIZE WINNER IS A "TOOL STEEL" GEAR USER

TOOL-STEEL QUALITY GEARS AND PINIONS

The Standard of Quality





LOS ANGELES RAILWAY CUTS CAR MILE MAINTENANCE

The Los Angeles Railway Company has, for the last three years, handled all its own motor maintenance.

Every car motor is given a shop overhauling every 20 months and whether any rewinding is necessary or not, each armature is treated with insulating varnish and oven baked before it is again assembled and put back in service.

Mr. Turley, Electrical Engineer, states that since the inauguration of this policy there has been a marked decline in the number of burnt out motors in wet weather and that maintenance costs per motor in service have been greatly reduced.

Let us give you the data on motor protection.

YOUNG BROTHERS COMPANY
6520 MACK AVENUE, DETROIT, MICHIGAN

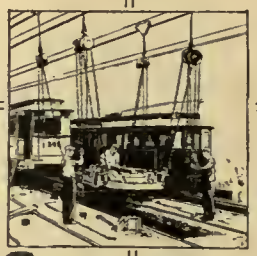
DISTRICT SALES OFFICES

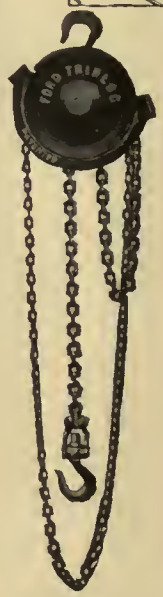
30 Church St. - - - - - New York
1424 GuaranteeTitle Bldg.,Cleveland
410 Granite Bldg. - - - St. Louis
419 Call Bldg. - - - San Francisco
988 Ellicott Square - - - - Buffalo
20 E. Jackson Blvd. - - - Chicago
807 SanFermandoBldg.,Los Angeles
248 Central Bldg., - - Seattle, Wash.
10 High St. - - - - Boston, Mass.

OVENS FOR Core and mold baking — Low temperature heat treating — Drying, Japanning and Enameling — Electrical appliance baking — Adapted to all methods of heating.

YOUNG BROS. CO. OVENS — OUR BOLTLESS JOINT — DETROIT

INDUSTRIAL OVENS





TRIBLOC
¼ to 2 tons.

Some costs cannot be avoided, but.....

Even in car and bus repairing there exist costs that can be lowered. In this work there can be no exception to the rules that govern low-cost manufacturing—*idle time* and *costly effort* of manual load lifting eat up profits just as fast in the car shop or bus garage as they do in the factory. Reduce these costs and save an extra profit by using the only Chain Hoist on the market that is expensive to make, yet sells at a competitive price—Ford Tribloc.

Send for Catalog 7-B

FORD CHAIN BLOCK CO.
2nd & Diamond Streets,
Philadelphia, Pa.

TRIBLOC CHAIN HOIST

2379-D

"American"



Light and Heavy SPRINGS

Advantageous location for prompt delivery of raw materials—Ample equipment of modern automatic machinery and appliances — Pyrometer equipped furnaces assuring accurate, uniform heat treatment and over 35 years' spring manufacturing experience constitute a service which means satisfaction.

May we estimate on your needs?

AMERICAN SPIRAL SPRING & MFG. CO.
Established 1887
ARSENAL STATION
PITTSBURGH, PA.,
U. S. A.

Electric Railway Journal Maintenance Data Sheet

LINE DEPARTMENT—4

Removal of Ears in Special Work*

By W. T. Trautman
Superintendent of Emergency Division,
United Railways & Electric Company,
Baltimore, Md.

TWO of the greatest difficulties in the maintenance of overhead special work structures are the renewal of ears and the prevention of trolley wire breaks. The trolley wire and ears in special work are punished particularly at ear supports due to the hard spot. In addition considerable maintenance work is required to keep the straight line trolley wire in good alignment due to the hangers creeping on the curve pull-off wires.

On lines of the United Railways & Electric Company, these conditions have been mitigated by eliminating approximately 2,300 ears from the straight line trolley wire in special work locations at the points of intersection with the curve pull-off wires. The pull-offs are elevated on the poles to clear the straight line trolley wire by at least 12 in. The removal of these ears has aided in keeping the special work in good alignment and in eliminating the severe localized burning and cupping which formerly occurred at each ear.

As it has been necessary to renew the ears on an average of at least twice each year, their removal has effected an annual saving in the maintenance budget of approximately $4,300.



Special work after the removal of ears and the elevation of the pull-offs

*Submitted in Electric Railway Journal Prize Contest.

Electric Railway Journal Maintenance Data Sheet

SIGNALS—3

Device for Removing Piston Rod Retaining Rings*

By A. D. Moore
Electrical Department, 69th Street Terminal,
Philadelphia Rapid Transit Company,
Philadelphia, Pa.

CONSTANT use of the threads of piston-rod retaining rings for electro-pneumatic signal apparatus of the Philadelphia Rapid Transit Company, subway - elevated lines, causes them to become jammed, making it impossible to remove them with a hand spanner wrench. To overcome this difficulty a combination clamp and ratchet spanner wrench has been designed and built by the shop forces. The piston clamp is a split cylinder welded to a base. Lugs for the clamping screw are also welded to the cylinder. A Toledo No. 00 pipe-threading device was adapted for a spanner and ratchet handle. Dies were removed from a ½-in. stock and two pins inserted in the face to engage with holes in the retaining ring. In order to provide positive engagement between the pins and ring an extension was welded on the back of the stock, which threads into a tailpiece. As the pitch of these threads is the same as that of the rings the spanner and ring back off together.

The hole through the die stock was continued through the extension to allow the piston rod to extend through. A ratchet handle is used with the die stock in the usual manner. As no changes are made in the handle it may be used for pipe threading when necessary.

This device is used also for tightening rings when they are replaced as well as for removal.



Piston-rod retaining rings are removed easily with this device

*Submitted in Electric Railway Journal Prize Contest.

Electric Railway Journal Maintenance Data Sheet

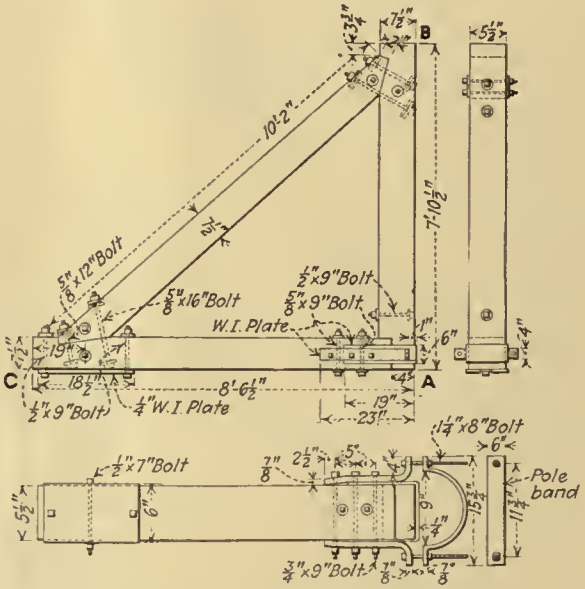
LINE DEPARTMENT—5

Fixture for Straightening Steel Poles*

By H. E. Bean
Engineer Way and Structures, New York State Railways, Syracuse, N. Y.

BENT steel poles are straightened on lines of the New York State Railways, Syracuse, N. Y., by using the device illustrated. After throwing slack into the span the pole is heated to a dull red color with a kerosene burner. The straightener is then fastened to the pole by a band at the bottom and a chain at the top. Two or three wraps of chain prevents sliding up of the pole. A jack is placed under the arm at *C* and the pole is bent back to the desired position and is allowed to cool without quenching.

If poles need reinforcing due to excessive strain, five reinforcing rods, each 5 ft. long, are wired around two light cast rings and lowered into the pole. This cage is held in a position midway above and below the ground line by securing the lowering wire. Concrete is then poured into the pole to the top of the reinforcing bars.



Device used for straightening poles
A—Band bottom. *B*—Top or chain attachment. *C*—Position where jack is placed.

*Submitted in Electric Railway Journal Prize Contest.

Electric Railway Journal Maintenance Data Sheet

SIGNALS—4

Apparatus for Checking Signal Relays*

By W. R. Hornberger
Electrical Department, 60th Street Terminal, Philadelphia Rapid Transit Company, Philadelphia, Pa.

DESIGNED primarily for checking movements of relays for signal control, an apparatus has been developed by the shop forces of the electrical department, Philadelphia Rapid Transit Company, subway-elevated lines.

The apparatus consists of a motor-driven double-pole contactor and two electro-magnetic operated Veeder counters. The primary circuit is broken at one pole of the contactor through the primary counter magnet. The second contact interrupts the control circuit of the apparatus being tested. The secondary circuit is broken at the contact of the apparatus under test and operates the secondary counter magnet. If the device to be checked has no contacts a breaker for the secondary circuit may be attached to its moving parts.

A cam mounted on the oscillating shaft of a fan motor operates the contactor, and closes the contact once each revolution of the oscillator shaft. Speed variation is obtained by a rheostat. Motor, contactor and counter magnets are mounted in a small wooden cabinet. Ventilation is by a small fan on the motor shaft. The counters, rheostat and terminals are mounted on a Bakelite panel.

The contactor closes both circuits simultaneously and operates the primary counter. It also closes the control circuit to the apparatus under test. The secondary circuit is closed to operate the secondary counter. The counters should check.



Apparatus used to check the operation of moving functions of relays

*Submitted in Electric Railway Journal Prize Contest.

Adventures of

Old Man Trouble

on the

Hicksville Railway

Safety devices are to protect life and property and are not to be tampered with







IT MAY be a heroic act to save the cat from the burning deck, but why set the ship on fire? Furthermore, it may be considered heroic to stop a burning runaway car, but why jeopardize one's own life and those of others by setting the car on fire?

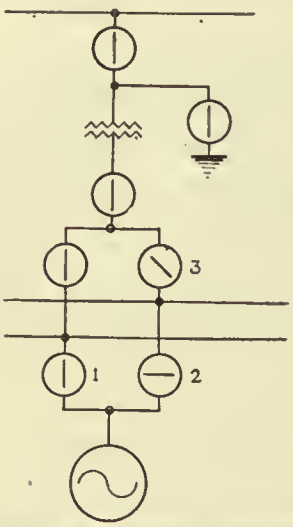
ELECTRIC RAILWAY JOURNAL will be glad to furnish press proofs of this page for posting on bulletin boards and will supply electrotypes of this series at cost for use in company publications.

J. M. Zimmerman and E. L. Proctor, Westinghouse Elec. & Mfg. Co.

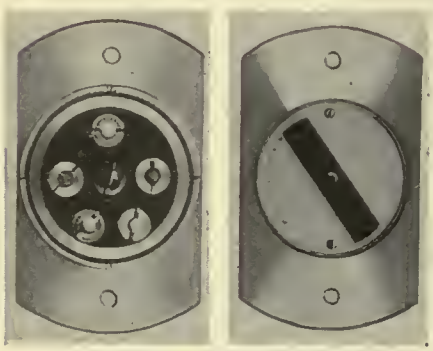
New Equipment Available

Three-Position Indicator

DESIGNED primarily for installation in a load-dispatching board to repeat the positions of various switches on the system, a new type of indicator is being marketed by R. W. Cramer & Company, Inc., New York, N. Y. This indicator is of the semaphore type giving three indications. It may also be used in interlocking boards to repeat the condition of track sections and show whether they are occupied or not by cars or trains.



Circuit diagram with indicators



Front appearance of indicator

The movement of the semaphore is obtained through either of two electrical magnets. Energizing either of these coils will cause the semaphore to move in either direction from its energized position through an angle of 45 deg., making the angular distance between energized positions 90 deg. The three indications given by the indicator, therefore, would be (1) switch closed; (2) switch open, and (3) in a position to indicate trouble.

The indicator operates normally on 12 to 14 volts direct current, although it may be operated on higher voltages with either direct or alternating current. The load per coil is 1 watt. Coils are designed for continuous service. The semaphore is restored to its de-energized position by means of a hair spring located behind the dial face.

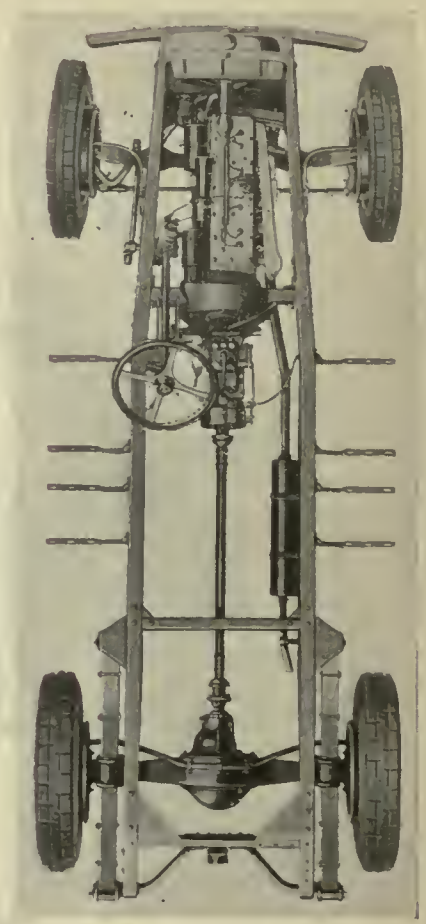
Among the advantages claimed for these indicators are that they occupy less space than lamps and require less power. One indicator will replace two lamps, and there are no filaments to burn out. The indicator shows the actual switch position graphically and facilitates supervision. It also eliminates optical errors.

These indicators are made in two sizes with dials $2\frac{1}{4}$ in. and $1\frac{1}{8}$ in. diameter. They are designed for flush installation on switchboard panels with control wire terminals in the rear.

New Line of Six-Cylinder Trucks

SIX-CYLINDER trucks in a complete new line are announced by Graham Brothers, which is the truck division of Dodge Brothers, Inc. These provide quick acceleration and braking together with fast economical service. A four forward speed transmission in the new 2-ton chassis gives added pulling ability for emergencies and makes possible moderate engine speed for fast long runs.

The six-cylinder engine has a seven-bearing crankshaft that weighs but 69 lb. Connecting rods are of chrome-vanadium steel and pistons of light alloy. The chassis is designed for minimum weight consistent with rugged strength. Lockheed hydraulic four-wheel internal expanding brakes provide quick and positive braking and make control easy. In addition to the hydraulic brakes the hand lever operates a propeller shaft brake for use when the truck is parked.

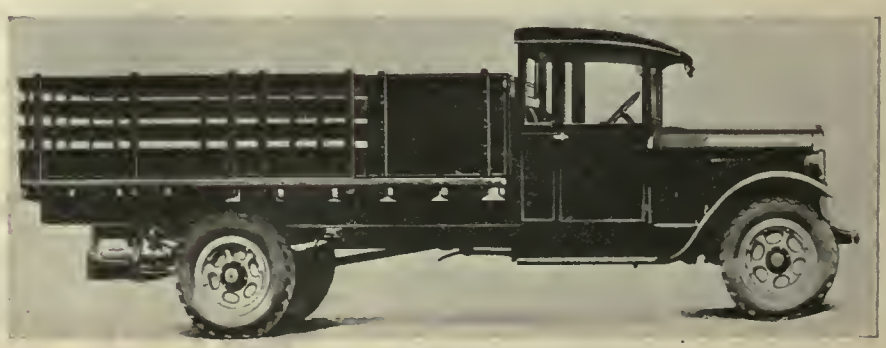


Chassis for new 2-ton truck

"Uneeda" regular and systematic schedule of inspection and maintenance.

Changes in Visible Thermostat

SEVERAL changes in its new visible thermostat are announced by the Railway Utility Company, Chicago, Ill. The upper end of the mercury tube is held in place by a



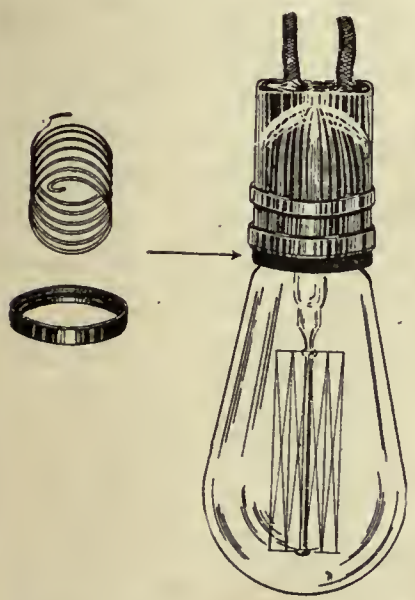
Equipment arranged with stake body

transparent glass front, while the lower end is held by a copper tube encircling the bulb. This copper tube terminates in a circular projection on the lower outside end of the metal case and acts as a heat exchange element. It is heat insulated from the case and responds quickly to changes of temperature in the car.

A molded rubber bushing on the upper end of the thermometer tube acts as a cushion against shock. A molded insulation back may be screwed permanently to the car wall. If it is necessary to change the temperature setting the mercury tube must be replaced. To remove this two screws are taken out which clamp the thermometer case to the molded back. Two additional screws which hold the mercury tube provide for easy removal and replacement.

Lock for Weatherproof Sockets

LAMPS can be locked in molded composition weatherproof sockets by a construction just announced by the Ren Manufacturing Company, Winchester, Mass. The locking mechanism consists of a coiled spring and a grooved ring. A particular



Lamp lock applied to weatherproof sockets

style of punch is used to apply the lock to the socket. The Ren lock grips the base of the lamp.

This type of lock has been previously applied to brass and porcelain sockets, but the new development is in connection with weatherproof sockets for lamps used out of doors or in damp locations.

Dick Prescott Fires Welcher

And Closes an Unpleasant Incident



DICK PRESCOTT, assistant superintendent of the Consolidated Railway & Light Company shop, was amazed at the story told by Shorty Green, ringleader of the disaffected men in the truck shop. This confession, however, explained to Dick many things that had mystified and worried him for some time.

The young executive acted promptly and summarily. Soon after the committee representing the truck shop men had left his office, he called in Pete Welcher, whose jealousy of Dick's rapid promotion had prompted his attempt to breed discontent among the men. After reviewing the facts briefly, Dick informed Welcher that his services were no longer required in the Consolidated shop.

Caught red handed, Welcher showed his true colors, first by trying to shift the blame to some of his recent pals and then, when he realized that wouldn't work, by pleading ignobly for his job. This only served to confirm Dick's judgment of the man. He told the ex-inspector bluntly that treachery and double dealing had no place in the Consolidated organization.

When the word that Welcher had been dismissed spread through the shop there was a general feeling that he had been treated only as he deserved. Late in the afternoon, Dick's old friend Steve White, the carpenter shop foreman, came into his office to congratulate him on getting rid of a trouble maker. Although Dick had become Steve's superior, he never forgot his early days in the shop and the two men were fast friends. Dick always welcomed Steve's advice and frequently discussed general shop problems with him. The subject of Pete Welcher was soon dismissed, and Steve referred to the work of his own department.

"We're getting cleaned up in good shape this week, Dick, and our record of damaged cars held out of service for the month is going to show a big drop over last month."

"Fine! I'll bet that will make the transportation department sit up and take notice, eh?"

"Yes, you bet it will," replied Steve. "Those fellows are right up on their toes and they're after every car they can get."

"Good enough; that's the way they ought to be. Do you know, Steve, I've given a lot of thought and study to this business and the more I think about it, the more it fires my imagination. Why, say, some of these croakers that think the transportation business is on the way out are dead from the neck up. In my judgment the real trouble with this business has been that it nearly dried up from the inside out."

"I can understand that, all right," commented Steve.

"Understand it! Of course you can. You're the first fellow who got me thinking straight. Gee, I shall never forget the first week I spent in this shop! Even now, nearly every time we have a conference on a new idea somebody pops up with the old wet blanket hymn, 'We tried that twenty years ago.' Some day I'm going to have a framed sign hung in my office that will read, 'You ought to be twenty years wiser than you were twenty years ago.'"

"That sounds like good sense, all right, Dick, but seriously, I do think we're making real progress these last few months."

"I think we are too, Steve, but we're only starting. I've had one or two new things definitely in mind for several days. Come on down to the shop a minute, I want to go over them with you."

Without further discussion the two men went out into the shop. Dick led the way through the repair shop to one of the most recent types of cars that had been purchased on the property.

Association Activities

Power for Dorchester Extension*

By F. N. Carothers
General Foreman of Substations Boston Elevated Railway

CONSTRUCTION of the Dorchester rapid transit extension necessitated the building of a new automatic substation, located on Dickens Street near Fields Corner. This station furnishes energy not only for the rapid transit line but for the surface cars in this district as well. The equipment consists of two 3,000-kw. shunt-wound converter units with single-phase, outdoor, oil-cooled transformers. Alternating-current energy is transmitted through two 13,200-volt, 25-cycle, three-phase, No. 0000 underground cables, direct from the generating station in South Boston. Two other a.c. cables that will be used as an emergency feed are connected across town to the bus of Eggleston substation. Direct current is distributed to the lines for car service through eleven 1,000,000-circ.mil and seven 2,000,000-circ.mil feeders.

The transformers change the 13,200-volt, 25-cycle power to 440 volts for converter supply, being connected through oil circuit breakers, Y for starting and delta for running. The delta-connected oil switch is connected 30 electrical degrees ahead of the Y-connected oil switch. This gives very smooth operation in changing from starting to running position.

3,000-Kw. Converters Are Used

The converters are General Electric six-phase, shunt-wound, commutating-pole, 3,000-kw., 600-volt type. The direct current drops 5 to 6 per cent between no load and full load. They can be started and stopped by means of the supervisory system, but it is customary to allow them to function on load demand. Either converter can be made the leading or trailing unit, by the throwing of the hand-operated sequence switch. The leading unit goes into service through low-sustained trolley voltage on the d.c. bus, and the trailing unit goes into service when the load on the leading unit has reached its capacity for a period of 30 seconds. The units are shut down in the reverse order. The trailing unit drops out when the load has dropped to a point where one machine will safely carry it. The leading unit shuts down when the load remains at about 20 per cent of its capacity for a period of two minutes. At this point the tie feeders with manual stations are sufficient to keep the bus voltage normal. In event of failure of the leading unit to go into service, the trailing unit, after a short timing period, goes into service, and the supervisory notifies the system operator that the leading unit has failed.

The machines are protected from severe overload on the d.c. side by means of the MC-2 air circuit breakers in eleven d.c. surface feeders, and JR-10 high-speed circuit breakers in seven d.c. rapid transit feeders. There are also load-limiting resistors in the positive leads of the machines that will hold them to their commutating capacity, even if the d.c. bus should become grounded. These resistors also give a cushioning effect as the machines go into service. They are located in the basement directly below the converter. This is a departure from the usual practice, but has given no trouble in another station that has been in service for almost two years. The overload trip on the hand-operated d.c. machine circuit breaker has been allowed to remain on the breaker and is not set for any higher current than those of machines of the same capacity at manual stations.

It was thought that for this particular installation it would be better not to use high-speed circuit breakers in either the positive or negative side of the converter, as all d.c. feeders are tied into the system network, and trouble developing on one feeder, causing a blowout on the converter might result in the loss of several manual stations. It was decided, however, to protect the rapid transit feeders with high-speed circuit breakers and to use MC-2 breakers on the surface feeders.

At the present time three sections from this station feed the rapid transit lines, two of which consist of two 2,000,000-circ.mil and one of three 2,000,000-circ.mil cables. Each cable has its own high-speed circuit breaker connecting it to the station d.c. bus. In case of a section blowout, it is necessary for all breakers on a particular section to close simultaneously. Otherwise the first breaker to close would try to take the total load of the section, which it could not carry, and would blow out again just about the time the second breaker was closing. This also would blow out, resulting in a pumping action, and not restoring power to the section. Of course if it were possible to set the time delay reclosing relay exactly the same on all breakers of a particular section, this would not happen.

Insuring Opening of Relays

These relays are of the PQ time delay closing and instantaneous drop-out type, and cannot be set for absolute accuracy. To get around this feature it was necessary to connect the closing side of all No. 102 relays of each section in parallel, so that the first No. 102 to close would close all circuit breakers of the section. The first No. 102 was set to operate in seven seconds, the second in nine seconds and the third in eleven seconds. This also offers the advantage that should the first relay fail, the second or third relay would operate the breakers. The breakers would not close back on short circuit, for after a breaker opens, a resistance which is connected across the breaker feeds power to the fault, and the short-circuit detector holds it out until the load is such that the section will not be overloaded when it closes.

The actual operation of the reclosing feature is as follows: A circuit breaker blows out; the resistance of 15 ohms, which was shorted out by the breaker, allows some power to feed out on the cable. At the same time a B switch on the circuit breaker starts time delay relay No. 102 to start timing. When this relay has completed its timing and closes its contact, a circuit is completed to the M and N coils of the reclosing relay No. 182, but the torque of this coil is not sufficient to operate the contacts, and must wait for the aid of the A. B. coil that is connected from the feeder to the negative bus. If a grounded cable or third rail exists, the drop across the A. B. coils will be 0,

* *Abstract of a paper read at meeting of New England Street Railway Club, Boston, Mass., Oct. 27, 1927.*

COMING MEETINGS OF *Electric Railway and Allied Associations*

Nov. 28-30—American Institute of Electrical Engineers, regional convention, Drake Hotel, Chicago, Ill.

Dec. 1-2—Pennsylvania Street Railway Association, annual meeting, Scranton, Pa.

Dec. 2—American Institute Electrical Engineers, New York Section, Engineering Societies Building, New York, N. Y.

Dec. 2—Metropolitan Section, American Electric Railway Association, Engineering Societies Building, New York, N. Y.

Jan. 16-17—Midwest Electric Railway Association, Hot Springs, Ark.

Jan. 25-27—Electric Railway Association of Equipment Men, Southern Properties, Roosevelt Hotel, New Orleans, La.

Jan. 26-27—Central Electric Railway Association, Cincinnati, Ohio.

Jan. 31—New York Electric Railway Association, annual meeting, Hotel Commodore, New York, N. Y.

and it cannot give any aid to the MN coil. The consequence is that the circuit breaker cannot reclose and must wait until the trouble has been cleared, or for load to be reduced to a point where the drop across the A. B. coil will allow No. 182 to close its contacts, which recloses the circuit breaker.

In addition to functioning automatically, all pieces of apparatus in this station have supervisory control and indication from the system operator's office. That is, the system operator can start, stop or lock out of service either converter found open, close or lock out any a.c. or d.c. cable, as he desires, provided, of course, that all automatic features function. He cannot start a rotary if it has flashed over, has grounded windings, overheated bearing, or windings, or anything that might cause serious trouble.

The supervisory is of the Western Electric 8A distributor type, and allows system operator to give as many operations as desired, either opening, closing or both, at the same time. After an operation indication is given in five seconds. The position of all pieces of apparatus is checked at five-second intervals. Watt-hour meter readings on both converters, and R. T. feeders are transmitted to system operator's office over this supervisory.

Four No. 22 telephone wires rented from the New England Telephone & Telegraph Company are used from substation to system operator's office. The use of these wires are: One for operation, one for indication, one for synchronizing the distributors and the fourth is a common for all three.

Energy for rapid transit signals is supplied from two 50-kva., 13,200 to 600-volt, 25-cycle, single-phase transformers. Only one is being used at present, the other being held as a spare. The low-tension oil circuit breaker on the signals will reclose three times in case of trouble and then lock out. The supervisory notifies system operator on each operation and finally that is locked out. There are about ten seconds between first and second reclosing, and twenty seconds between second and third reclosing. The lockout only occurs in case of three consecutive blowouts in a space of about one minute.

While this station is completely automatic, it can be changed to manual operation, even with a complete failure of all automatic devices, in a period of about two minutes. For the ultimate extension to Ashmont, another similar station will be required on Beal Street near the Ashmont station. The order for electrical equipment has been placed.

New Features Embodied in Cars for Dorchester Extension*

By E. P. Locke
Engineer of Car Construction Boston Elevated Railway

PRIOR to receipt of the new cars for the Dorchester extension 95 similar cars were in use on the Cambridge subway. The general arrangement of the Cambridge subway cars embodies longitudinal seats, extending the full length of car at each side, except at door openings; three sliding doors on each side and a sliding door and gate at each end. The motorman's cabs are located in the right-hand diagonal corners of the car. These cars are 69 ft. 2½ in. long over all, with 51-ft. truck centers, and 9 ft. 6 in. wide, and are mounted on one trailer and one motor truck. They were purchased in three lots and are known as No. 1, No. 2 and No. 3. The 60 new cars are designated as No. 4.

The design of the No. 4 car, while in general the same as the earlier cars, differs in certain respects: The side doors on the old cars are arranged to slide into pockets in the sides of the car. The No. 1 and No. 2 cars have wooden doors, but on the No. 3 car they are constructed of steel. All are operated by means of compressed air. On the No. 4 cars they are arranged to slide on the exterior of the car body, are constructed of wood covered with aluminum, and are actuated by means of electric mechanism. Provision is also made for hand operation, should that necessity arise.

The reasons for these changes are: Saving in weight, original cost, and in maintenance cost, due to the elimination of the door pockets; elimination of accumulation of snow in door pockets; increase in the inside width of car for passenger accommodation; elimination of unavoidable waste of air at door engines and of cold weather troubles such as slow door movement and failures due to freezing at valves.

The front edge of each side door on the No. 4 car is equipped with a wide molded rubber striker which closes against a flexible striker on the door post, instead of a single smaller bumper on the door only, as on the earlier cars. With this arrangement a person may easily withdraw a hand or foot without injury, should either become caught when the door is closed.

The weight of each side door, including hanger and fittings, is 110 lb., against approximately 190 lb., the weight of an all-steel door, a saving of 80 lb. per door. The total saving per car, in door weights, including side, end and cab doors, is approximately 640 lb.

Electric door engines are located under the seats and have a shaft extending through the side of car. To the outer end of this shaft is attached an arm that engages in a track on the back edge of the door. The operation of the doors is controlled by means of push button switches at both ends of the car, this arrangement being the same on all Cambridge cars.

All end doors and gates are inclosed in pockets in the end of car, when in open position. On the No. 1, No. 2 and No. 3 cars, the gate is outside the door, and, due to its construction, will allow snow to blow into the pocket to such an extent as to interfere with operation. On the No. 4 car this arrangement is reversed, i. e., the door is on the outside. It is fitted with a double weather strip at the back edge, which, it is believed, will prevent snow from entering the pocket and will also stop, to a large extent, the cold drafts at this point.

Lightness Gained in Composition Flooring

Combination of steel and composition floors used in this type of car has, in the past, resulted in a weight varying from 8 to 12 lb. per square foot, depending upon the material used. The reason for this is that it has been necessary to apply the composition to a thickness of 1 in. or more to withstand the tendency toward cracking, due to vibration and slight movement of the car frame. Flooring material is now available, however, which does not require the excessive thickness heretofore necessary and which has more or less flexibility to withstand the car vibrations. On the No. 4 Cambridge cars, the floor composition was specified to be laid to a thickness of ⅜ in.

All floor material is subject to more or less wear, and must, in time, be repaired. To repair the thick composition floors, it has been necessary to rough up the old material, and, in some cases, to chip it out in order to apply the new material in a sufficiently thick layer to prevent cracking. Some trouble has been experienced, also, in obtaining a good bond between the old and the new materials. It is expected that these troubles have been overcome in the material used in the new Cambridge cars, as experience has shown that resurfacing may be done by first cleaning the floor and then applying the material in thin layers until the floor is again brought to its original level.

The supporting plates on which this material is laid consist of two sheets of No. 22 U. S. S. gage copper bearing steel in which have been pressed staggered rows of oval shaped cones or depressions. Two such sheets are placed together so that the top of the cones of one sheet touch the top of the cones of the other. The two sheets are then riveted together through the cones. This results in a structure ⅞ in. thick, the surfaces of which are flat, except for the depressions, and which provides an air space between the sheets of approximately 1/16 in.

After they are riveted together, the sheets are dipped in rust-proofing paint. These sheets are applied to the car frame in lengths to extend from side sill to side sill and 30 in. in width, the frame being designed so that a supporting member or a splice plate will come under each

*Abstract of a paper read at meeting of the New England Street Railway Club, Boston, Mass., Oct. 27, 1927.

joint. The joints are made by inserting a freshly painted wood strip in the edge of one sheet and then telescoping the adjoining sheet into it.

Bolts are then inserted through the sheets, the wood filler and splice plates, or the supporting member of the frame. Wood strips are also inserted at the outside edges of the sheets before they are bolted to the side sills. In this way a practically sealed air space is obtained between the top and bottom members of the sheets, which serves as an insulator and which should have a tendency toward a warmer floor surface in cold weather, and also a tendency toward sound deadening.

The combination of the steel sheets and the surfacing material, as applied to the No. 4 car, results in a floor thickness of 1¼ in., 1⅜ in. of which is dead air space, and the weight of which is 6 lb. per square foot, or a total saving in weight of approximately 1,300 lb. per car, when compared with the 8 lb. per square foot weight.

All Cambridge subway cars, previous to the No. 4, have been equipped with spring upholstered seat cushions and backs when purchased. In the No. 4 car these have been displaced by wood slat cushions and backs at a material saving in weight and a decided improvement from a sanitary and maintenance standpoint.

The slats are only ½ in. thick. Those in the cushion are secured to galvanized corrugated iron sheets, which serve as the supporting member, and at the same time meet the requirements as to fire protection over the heaters and other electrical apparatus. The backs consist only of the slats, which are attached to ⅝-in. pressed-steel angles, bent to the proper shape and attached at top and bottom ends to the frame. The saving that is made in weight per car on this item is 429 lb.

New Lighting Scheme Employed

The appearance of the interior of the car is somewhat different from that of the older cars, due principally to the different lighting scheme. Instead of the old arrangement of three rows of 36-watt lamps, without reflectors, the new cars have ten 94-watt lamps mounted in pendent type, statuary bronze fixtures having glass reflectors. These are arranged in a single row at the longitudinal center line of the car. Interspersed with these are five emergency lamps that are also equipped with glass reflectors of similar shape, although smaller than those of the regular lamps. If, for any reason, the electric current fails and the 94-watt lamps are cut out, the emergency lamps are automatically cut in through a relay, so that the car will not be in darkness.

An improvement from the standpoint of appearance and also with respect to maintenance cost is the adoption of electric tail lights in place of the old-type steam railroad oil lamps that are carried on brackets at the ends of the cars. The tail lights on the new cars are arranged in permanent boxes constructed in the ends of the cars, only the red lens and lens-retaining casting being visible from the exterior of the car. Each box is equipped with one 36-watt lamp for regular use and with one emergency battery lamp. As in the case with the interior lighting, the emergency tail lamps come in on loss of the regular current, or in case of a failure of one of the regular 36-watt lamps in this circuit.

In cleaning windows considerable time is lost in thoroughly removing the dirt from the corners of the glass, and, if care is not exercised, it is apt to accumulate at these points, resulting in an unsightly appearance. To overcome the need for cleaning the corners and also to remove the unsightly appearance should dirt accumulate, sanitary corners, so called, have been applied to all sash, both inside and outside the glass, except at sash lifts, where they are outside only. These consist of thin pieces of brass laid against the surface of the glass and flanged over the edges. They are applied when the sashes are glazed and are held in place by the glazing rubber.

In the earlier lots of cars no provision was made for heating the motorman's cab. This has been arranged for on the No. 4 cars, however, by utilizing a portion of the heat from one of the regular heaters under the longitudinal seat adjacent to the cab. The top of the heater is perforated, thus allowing the warm air to pass up through into a duct which carries it to the cab partition, where it enters the cab through a grille-covered opening. The upper portion of the cab partition contains a permanent wire screen, over which may be drawn a duck curtain to exclude light when the cab is used for operating purposes. This arrangement replaces the sliding steel panel used on the earlier cars, and will result in some saving in maintenance cost.

Frequent, Thorough Inspections Reduce Car Failures*

By Henry Cordell
Master Mechanic Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.

REGARDLESS of what type of equipment may be purchased by any system a proper periodical inspection and overhauling must be carried on. There is a divided opinion as to how and when inspection and overhauling should be done. Some companies inspect on a car mileage basis, others on a daily basis, and still others on a kilowatt-hour basis. Each one presumably is getting satisfactory results. On our road we use the mileage basis, inspecting all equipment on our rails on a 1,000-mile basis and giving a general overhauling every 100,000 miles. We have found it advantageous also to carry on a daily terminal inspection. An inspector is on duty to adjust brakes, change trolley poles and repair minor defects that may be found or reported by crews operating the train. Taking cars out of service and interfering with schedules is thereby avoided.

With multiple-unit interurban cars such as we use the control jumper plays a vital part and is given a rigid test periodically. The transportation department is requested at the first of each month to return to the shops all jumpers for tests. Jumpers tested and found perfect are painted a certain color. The four colors red, green, white and black are used each month in turn. Careful observation has shown that after four months individual wires in the cable begin to break and that failures will occur if the jumper should be retained in service. After years of experimenting we adopted the following jumper cable specifications:

Each conductor consists of 104 strands of No. 32 B.&S. gage tinned copper wire braided around a No. 19 B.&S. gage tinned steel piano wire center. The insulation consists of paper wrapping, ¾ in. of pure Para or Hevea rubber and single soft cotton braid. The conductors are arranged around a hemp center and laid in a twist of 6⅜ in. to 1 ft. for inside conductors and one turn to the foot for outside conductors. This is important, as we desire no twisting action when jumpers are made up to a length of 36 in. The twelve cables are finally covered with a double braid, tightly woven and saturated with a weatherproof compound. The compound used for filling receptacles or heads consists of 50 per cent rosin and 50 per cent beeswax. This mixture is a perfect waterproofing compound of high dielectric strength.

Control Equipment Must Function

Next in order of importance to keep a train on time is the proper functioning of the control apparatus on the car. Resistance failures can be reduced to a minimum if the grids are properly installed in the first place and a rigid inspection is followed. The insulation between frames and hangers should be porcelain spools over micarta-insulated bolts. The grids should be drawn together as tightly as possible. Burning between grids is inexcusable and will not occur with proper inspection. All terminals at junction boxes, controllers, circuit breakers, switches and resistance should be checked at every inspection, and if found loose or showing signs of overheating should be taken care of then. Switch parts, controller fingers and segments should be renewed before they are worn to the extent where failure may occur while the car is on the road.

**Abstract of a paper presented at the annual convention of the Operators' Section, Iowa Electric Railway Association, Davenport, Iowa, Nov. 2 and 3, 1927.*

There is no economy in the "I guess that one will last another inspection" method.

Serious delays to the service are caused by hot boxes, particularly on journal bearings. Extremely hot or very cold weather aggravates this kind of trouble, the viscosity of the oil being the determining factor. It is impossible to change oil over night to meet the climatic conditions, therefore a positive means of getting oil to the journals must be provided. The capillary feed of wool waste will not provide sufficient lubrication for much more than 2 in. For high-speed service we found it necessary to carry enough oil in the boxes to keep well inside this height. Before leaving terminals on very cold days, on the first trip out we pour a small quantity of oil along the journal on top of the waste so that lubrication is provided until the journal becomes warm.

Bearing Metal Requires Careful Handling

Journal temperature increases with speed, and prolonged high-speed running brings the temperature up to a point where lubrication is difficult. Greater care should be taken in babbitting journal bearings and in proper machining, so that newly fitted bearings have a contact surface sufficiently large to carry a load not to exceed 300 lb. per square inch of projected bearing surface. Journals badly worn, tapered or out of round cannot meet the requirements and must be trued. This is standard practice in our shops when new wheels are being mounted. We do not permit axles to remain in service with a taper exceeding $\frac{1}{16}$ in. or below $\frac{1}{4}$ in. of the original size.

Care should be taken that the babbitt used in bearings is not overheated. Most alloys used for journal linings will not give good service if heated over 800 deg. F. The old pine stick for determining the heat of molten babbitt should be discarded and a pyrometer used. Proper tinning is necessary to obtain thorough amalgamation. We have experimented with several kinds of tinning, and find that satisfactory results are obtained by using for tinning the same babbitt that is used for pouring, provided the proper temperature of the shell is maintained and the surface is perfectly clean. Journal bearings are made from a composition of 70 per cent copper, 5 per cent tin and 25 per cent lead. For the other bearings we use babbitt metal of 89 per cent tin, 4 per cent copper and 7 per cent antimony.

Limit gages for determining wheel flange wear are furnished the inspectors and a close check is kept on wheel conditions. The gage is made with a generous allowance, so that at all times wheels are removed from service for turning before condemning limits are reached. Axles are tested whenever taken out of service by careful cleaning with gasoline, subjecting them to blows from a 12-lb. sledge and observing under a powerful magnifying glass. The smallest crack condemns the axle. Only hammered, heat-treated, steel axles are used.

If air-brake piping is installed without regard to proper clearances, is sprung into place when connected, is poorly cleated or if there is not enough radiation allowed between compressor and tanks, you may expect trouble from freeze-ups and generally poor performance. Repair work should be assigned to men in a separate department, as nearly free from dust and noise as possible. Local cleaning of triple valves, feed valves and other apparatus, except brake cylinders, should not be done when the car is in for inspection. Enough spares should be on hand so that the inspector may install a clean, adjusted and tested unit. Home-made test racks may answer the purpose, but for reliability and accuracy special test racks should be used. Dead weight testers for gages should be available so that inspectors may check their gages at frequent intervals. Replacement of air hose should be periodical. One year seems to be the natural life of air brake hose but conditions may shorten it. Inspectors should use their judgment in replacing and be held responsible for road failures.

Preventing Air Freeze-Ups

Freeze-ups of radiation pipe can be avoided by installing a safety valve mounted on a pipe about 18 in. long and tapped about 6 or 8 in. from the compressor head on the discharge line. We set this safety valve at 5 lb. above the pressure at the tank. We have found that the opening into the tank is not entirely closed when this valve opens with each stroke of the compressor. This gives the operator ample warning. By heating (a fuse being used at the tank) the obstruction is quickly removed. Not a single car equipped with this simple device has been taken out of service in several years.

Renewal of trolley wheels or slides should be determined by limit gages. This will effect a saving of delays as well as serious damage to overhead, due to use of wheels or shoes too deeply worn. Trolley bases should receive the same attention as other electrical devices on the cars. The spring tension should be tested with a dead weight and a standard pressure adopted. We carry 35 lb. pressure against the wire. This may seem high, but it is necessary at high speed and on locomotives where heavy currents are required. Retrievers are tested in a rack which simulates road conditions. They are painted to indicate the inspection date, as are the jumpers. Trolley bases are inspected and painted in a similar manner.

Motor Leads Must Be Protected

Motors give little trouble, but the leads which cannot be protected from mechanical injury by conduit are subjected to extremely hard usage and give trouble unless properly located, properly cleated and properly protected. A wire armor consisting of No. 12 steel spring wire closely wound and slipped over the motor leads will protect them against mechanical injury. Motor leads should be rather long to provide slack on sharp curves or in raising the car body for inspection and greasing. As the cars come in for the 1,000-mile inspection a thorough examination is made of the hoods, wire bands, brush-holders and commutators, leads, lateral motion, bearing wear, etc.

One of the greatest mistakes is to allow temporary work, which if continued will sooner or later ruin the best equipment obtainable. The smallest crack in a wheel or axle or part of a truck or brake rigging, or the slightest irregularity in the operation of an electric circuit, invariably leads to serious delays, possible loss of life and extended damage to equipment.

Southern Equipment Men's Meeting at New Orleans

NEW ORLEANS has been chosen for the next meeting of the Electric Railway Association of Equipment Men, Southern Properties, which will be held there on Jan. 25-27, 1928. Headquarters will be at the Roosevelt Hotel.

A.I.E.E. Regional Meeting at Chicago

SEVERAL papers of special interest to electric railway men will be presented at the Great Lakes regional meeting of the American Institute of Electrical Engineers to be held at the Drake Hotel, Chicago, Ill., on Nov. 28-30. The entire Tuesday afternoon session will be given over to the subject of railway electrification and industrial application. Bion J. Arnold will preside. The following are the papers on railway subjects:

"Illinois Central Electric Operating Experiences," by W. M. Vandersluis, Illinois Central Railroad.

"Operating Experience with 125-Ton Storage-Battery Locomotives in Chicago Railroad Terminals," by Edward Taylor, General Electric Company.

"Operating Performance of Rectifiers," by Caesar Antoniono, Chicago, North Shore & Milwaukee Railroad.

Other sessions at the convention will include a symposium on 132-kv., single-conductor, lead-covered cable, one on power systems and one on communication. The Monday sessions will be devoted to a student convention, several problems of design being considered.

British Standard Rails

REVISION of the British standards for tramway rails and fishplates has been made and the British Engineering Standards Association has issued a revised edition of the standard specification covering them. The basic bessemer process for the manufacture of the steel has been eliminated in accordance with a recent decision of the association. A new dwarf rail section (No. 10, 95.4 lb. per yard) has been introduced, intended for carrying heavy loads. Copies of the specification may be obtained for a nominal fee from the association, 28 Victoria Street, Westminster, London, S. W. 1.

American Association News

American Executive Committee Discusses Depreciation

CHIEF interest at a meeting of the American executive committee held on Nov. 11 at association headquarters, centered in discussion of the depreciation hearings now being held before the Interstate Commerce Commission. Dr. Thomas Conway, Jr., chairman of the sub-committee on depreciation, presented a very clear picture of the situation. He pointed out that the Interstate Commerce Commission interprets the transportation act of 1920 as a mandatory order to formulate rules for depreciation and to prescribe percentages of depreciation for various classes of property involved. In 1924, the commission promulgated a tentative order and at that time the sub-committee on depreciation was formed for the purpose of representing the electric railway industry. The final orders were promulgated in 1926, designed to cover conditions of telephone companies and steam railroads. A few months later the commission served notice on the electric carriers requiring them to show cause why a similar order should not be made to apply to them.

If the steam railroad classification were applied to the electric railways the provisions concerning depreciation would be detrimental to the interests of the latter. First, it is required that all past depreciation be set up on the books as a liability. The effect of this order, Dr. Conway pointed out, would be to wipe out the surplus of a good many companies and cause a deficit in others.

Secondly, many of the major maintenance expenses such as renewal of rails, ties, ballast, special work, etc., are transferred from operating accounts and are to be covered by three accounts: Depreciation of Way and Structures, Depreciation of Equipment and Depreciation of Power Plant. This change would have the effect of destroying the landmarks which executives have used for years in gaging the efficiency of their operation. It would be impossible to compare the new operating costs with those of previous years because of this radical alteration. Moreover, it would be required that the companies set up a definite amount for depreciation each year and divide it by 12, for each month. The consequences of that would be that in time of business depression, when traffic falls off, it would be impossible to defer maintenance and renewal programs for the purpose of conserving the net revenue. This again would seriously threaten the financial status of the electric railways.

Thirdly, it would require that the executives of the companies in their annual reports to the commission state the extent to which maintenance has been deferred or neglected and swear to the accuracy of the statement. Dr. Conway said that this would be a serious matter in lean years. The information becomes a matter of public record and many people undoubtedly would take such statements to the bankers and it would tend to impair credit and diminish traffic, because of the feeling that the railway was unsafe on account of deferred maintenance.

The co-operation of the Investment Bankers Association has been sought to prevent the application by the Interstate Commerce Commission of these rulings to the electric railways. It was brought out that approximately one-third of the electric railways come under the jurisdiction of the Interstate Commerce Commission. A more serious phase of the situation, however, is that the various state commissions probably would follow the lead of the I.C.C. so that in a short time its rulings would affect the entire industry.

The present status of interstate bus legislation was outlined by J. H. Hanna, chairman of the committee on national relations, and L. S. Storrs. The recommendation of the national relations committee that passage of the Denison bill be favored was adopted. This differs from the bill proposed by the electric railways two years ago only as regards the so-called "grandfather clause." It does not apply to automobile trucks.

Routine business of the meeting included the reports of the committees on publicity presented by J. W. Welsh; membership by C. E. Morgan; finance by T. A. Kenney and convention location by Frank R. Coates. It was brought out in the report of the finance committee that the revenues of the association this year are expected to be substantially larger than last year on account of the new dues. At the same time, the association has taken over the activities formerly sponsored by the Advisory Council and the expenses will be correspondingly increased. Otherwise, no important changes from the appropriations of the preceding year were recommended by the committee.

A resolution was presented by W. H. Sawyer expressing the sincere grief felt by the executive committee in the death of Harry L. Brown. The vacancy thus created was filled by the election of E. F. Wickwire, vice-president of the Ohio Brass Company.

Plans of the Engineering Association were touched upon briefly by R. H. Dalgleish. He mentioned particularly the valuable results that are being obtained by the committee on welded rail joints. Edward Dana said that the work of the Transportation & Traffic Association for the coming year is already under way. J. S. Kubu presented a resolution expressing the great interest of the Claims Association in the Hoover Conference recommendations. T. B. MacRae spoke of the necessity of co-ordinating the work of the Accountants Association with that of the American Association in connection with the Interstate Commerce Commission classification of accounts.

Representatives of five state and sectional associations spoke briefly. These were R. F. Carbutt, Metropolitan Section A.E.R.A.; H. B. Potter, Maryland Public Utilities Association; W. R. Power, Kentucky Utilities Association; A. E. Reynolds, Missouri Public Utility Association; and R. B. Stearns, New England Street Railway Club. Mr. Stearns mentioned the importance of keeping the various public utility information bureaus out of politics.

Past-President George H. Harries expressed his interest in the matters now being discussed with the Interstate Commerce Commission and recalled some of his own experiences along similar lines in previous years. A suggestion was made by Luke Bradley that a half hour be set aside at each future meeting of the executive committee for a general discussion of the state of the industry.

Members present at the meeting were: R. P. Stevens, president; J. P. Barnes, J. H. Hanna, C. E. Morgan, L. S. Storrs, W. H. Sawyer, T. B. MacRae, J. S. Kubu, R. H. Dalgleish, Edward Dana, G. A. Richardson, T. A. Kenney, M. B. Lambert, S. J. Cotsworth, C. R. Ellicott, L. C. Bradley, J. H. Alexander, D. W. Snyder, Jr., J. G. Barry, J. R. Fitzpatrick, J. W. Welsh, and Past-Presidents F. R. Coates, J. N. Shannahan and G. H. Harries.

New Association Members

ELEVEN manufacturing companies and twelve individuals were elected to membership in the American Electric Railway Association at the meeting of the executive committee held at association headquarters Nov. 11. Eleven of the new individual members are affiliated with the Engineering Association and one with the Transportation & Traffic Association. A list of the new company members follows:

Air-O-Pure Company, Cleveland, Ohio.

Ajax Manufacturing Company, Newtonville, Mass.

American Wicker Works, Minneapolis, Minn.

Asbestos Spinning & Weaving Company, New York, N. Y.

Fraser Electric Transmission Corporation, Cleveland, Ohio.

Highway Trailer Company, Edgerton, Wis.

McGill Metal Company, Valparaiso, Ind.

Moccasin Bushing Company, Chattanooga, Tenn.

Page Steel & Wire Company, Bridgeport, Conn.

L. Schiavone & Bonomo Brothers, Jersey City, N. J.

Special Bolt Machinery Corporation, New York, N. Y.

News of the Industry

Further Delay in Detroit

Jitney operators there made final move to secure review of order removing them from streets

FURTHER delay has been won by Detroit jitney operators in their fight against being ousted from the main thoroughfares of Detroit in accordance with a city ordinance, the validity of which has been upheld by the Michigan Supreme Court. The United States Supreme Court recently dismissed the appeal made by counsel for the jitney drivers' associations, stating that no federal question was involved. This action was popularly regarded as ending the jitney fight. The controversy was, however, reopened on Oct. 26 when the State Supreme Court granted Edward N. Barnard, counsel for the jitney drivers' associations, seven days' time in which to prepare a brief in support of a motion for rehearing on the case decided previously by that court in July, 1926. Mr. Barnard's brief has been filed with the court.

Jitneys Likely to Operate Until December

This action by the State Supreme Court will probably result in the jitneys operating unmolested on the streets of Detroit until some time in December. According to a statement by Corporation Counsel Charles P. O'Neil, it is possible for the court to get around to a decision within the next two or three weeks, and if it does the new move by the jitney drivers will not delay the banishing of the vehicles from the streets because it will take that long for the order of the Supreme Court to come down.

Mr. Barnard contends that the U. S. Supreme Court order merely held that there was no federal question involved. He further contended that the state court can reopen the case if it desires. In support of his motion, Mr. Barnard pleaded that the case is an unusual one in view of the public interest in the litigation and the importance that attaches to it. He submitted that the state court, in exercise of sound discretion and in order that justice may be served, should reopen the controversy. He cited certain alleged cases where such procedure had been followed "in the interest of substantial justice."

The motion for a rehearing was based upon the fact that while the U. S. Supreme Court recently denied the attempt to have the jitney ordinance declared class legislation and unconstitutional, the opinion stated that while the court lacked jurisdiction to act, sufficient evidence had been presented to make the matter one of which the State Supreme Court might take cognizance.

Mr. O'Neil, Corporation Counsel, stated that no new question had been raised by Mr. Barnard in his new motion and that everything he contends has already been decided by the court. Mr. Barnard and Mr. O'Neil have both signed a stipulation that there will be no oral arguments at the new hearing before the State Supreme Court. At the end of the seven-day period allowed for filing briefs the court will have adjourned its sessions, not to convene again until after Dec. 15.

Staten Island Municipal Trolleys to Be Sold

With the announcement on Nov. 16 that the city will sell at auction the 53 dilapidated trolley cars it formerly operated on Staten Island, the Walker administration prepared to write the final chapter in the story of the Hylan administration's Richmond enterprise. The trolleys are to be sold at auction in the Municipal Building on Dec. 5. When operation of the system was suspended last July most of the cars were literally falling apart. Service stopped when the Staten Island Edison Company refused to furnish power because the city had declined to pay bills already submitted. Meanwhile buses under private operation have replaced the cars. The railway system was taken over by the Hylan administration when the railway refused to operate any longer at a 5-cent fare. Included in the sale will be seven trackless trolleys.

Rapid Transit Moves in Chicago

New subway draft ready for consideration in Chicago as Aldermen return from subway study in Europe. Traction enabling bills advanced

PLANS for a comprehensive system of subways incorporating the best features of all other transit tubes and adequately providing for the downtown district at its maximum development were again brought to light in Chicago when a report based on recommendations made a year ago by the Citizens' Advisory Subway Commission was submitted to the City Council local transportation committee on Nov. 14 by Major R. F. Kelker, Jr., city engineer. A committee of Aldermen, armed with the new subway specifications, left Chicago on Nov. 16 for New York, where they will meet and discuss the draft with Michael J. Faherty, president of the Board of Local Improvements, who returned from Europe on Nov. 18 after completing a six weeks study of the subways of several foreign cities.

The latest project provides for a tube or "lower level street" under State Street, linking with the elevated lines on the north at North Avenue and with the south side branch of the "L" at Sixteenth Street. Between Randolph and Polk Streets, in and adjacent to the Loop district, there would be four tracks, with two tracks at the extremities of the line. Adjacent subway systems for both elevated and surface lines, it is proposed under the plan, are to be constructed after the completion of the State Street tube. Those for the elevated lines include underground tracks in Wells, Clark and Dearborn Streets running from Chicago Avenue, eight blocks north of the Loop, south through the Loop district to Polk Street and connecting with existing and projected main lines at either end. The Wells Street subway would connect with the north side and south side elevated lines, while the bore in Clark Street would connect at Chicago Avenue and Polk Street with projected northwest and southwest extensions of the present elevated system. The existing elevated loop, the structure of which now theoretically confines Chicago's downtown business district, would be eliminated and rapid transit trains now entering the Loop from the west side over the Metropolitan and Lake Street elevated structures would operate through subways under Van Buren Street, Wabash Avenue and Lake Street. These last-named tubes would be built on a different level to eliminate underground grade crossings with the north and south lines in Wells, Clark, Dearborn and State Streets.

Horseshoe Tubes for Surface Cars

The subways for the Surface Lines cars would consist of two horseshoe systems leading from the west side, under the Chicago River to the Loop and back again. A straight tube is planned from the Loop end of the present LaSalle Street tunnel under the river to an undetermined point south of the downtown district. The Washington and Van Buren Streets tunnels of the Chicago Surface Lines would be utilized for one of the horseshoe systems and two new tunnels under the river at Madison and Adams would be constructed for the other system.

The station platforms in the State Street subway, which it is proposed to build first, would be 520 ft. long and 18 ft. wide. They would be placed every two blocks in what is now the

Loop district. Outside that area, they would be built at Roosevelt Road, Polk Street, Ohio Street, Chicago Avenue, Division Street and North Avenue.

Although the new plans follow in a general way the recommendations of the subway advisory commission, one outstanding difference is in the length of the proposed State Street tube. Major Kelker proposes that the system end at North Avenue and Sixteenth Street, which would make it eight blocks longer than the unit with terminals at Chicago Avenue and Roosevelt Road suggested by the commission.

Twice as many passengers as are now brought in and out of the Loop district by the elevated lines, or a total of 136,000 riders an hour, could be handled by the proposed systems, according to Major Kelker. They would have an aggregate capacity of 45 eight-car trains in each direction per hour. This would probably be adequate, the Major believes, for downtown development just twice that now existing.

Announcement of the new subway plans on Nov. 14 accompanied the news that the City Council transportation sub-committee had given final approval to four of the five traction enabling bills and formally recommended them to the full local transportation committee. One of these bills provides for the consolidation of elevated, street car and bus lines, another for a local regulatory commission, a third permits the city to issue indeterminate permits and the fourth for a fixed-term franchise for a period not to exceed 40 years. The committee's decision to set a limit of 40 years was reached early this week after objections had been raised to its original action in removing all time limits. Under the terms of bill No. 3, the city would have the option of granting an indeterminate permit or a 40-year franchise.

The fifth bill dealing with subways still is unfinished and was taken to New York by the aldermanic committee along with the Kelker subway draft, so that any ideas that may have been gathered in Europe by Mr. Faherty may be incorporated in the bill. Debate centering around a proposal to amend this bill to give the City Council instead of the Board of Local Improvements sole right to initiate construction is another factor which may indefinitely delay approval of the bill.

All but the subway bill are expected to be presented to the full committee on local transportation on Nov. 22. Should they receive the approval of the Aldermen at that time they are subsequently to be submitted to the railway companies for inspection. When all differences have been settled it is planned to ask Governor Small to call a special session of the Legislature so that the bills may be enacted into laws.

Contract Suggestions and Recommendations in Philadelphia

Expert Bibbins advises agreement for Broad Street operation only. Mayor asks Council for quick action. Dr. Snow advises $77,000,000 expenditure

MAYOR KENDRICK of Philadelphia on Nov. 10 submitted to City Council a form of agreement, prepared by J. Rowland Bibbins, for operation of the city-owned Broad Street subway by the Philadelphia Rapid Transit Company. The proposed agreement, together with a report by Mr. Bibbins and a message from Mayor Kendrick, was referred by City Council to its committee on transportation and public utilities.

According to Mr. Bibbins' plan, it seems, the Philadelphia Rapid Transit Company would become, not a lessee of the Broad Street subway, but rather, as it were, a city employee, whose compensation for operating the line would be 3 per cent of the net earnings, roughly $75,000 a year. It is also proposed in Mr. Bibbins' plan to limit the term of the agreement to about 8½ years, thereby making it coterminous with the Frankford elevated railway agreement.

The summary as incorporated in the report follows:

1. Recommended: An operating agreement on the contingent return plan; city high-speed lines to be operated by P.R.T. as part of a city-wide transit system with co-ordinated feeders and the same fares, interline transfers and exchanges.

2. City has assumed the full financial burden of providing new rapid transit, hence it should receive the net revenues from city lines to support its investment. Under existing circumstances this will yield maximum city return.

3. Capital, revenues and operating expenses of the city lines to be kept separate and under continuous supervision of an experienced board of control, with appropriate city and company participation. Supervision is essential to the success of the contingent return plan, as a safeguard to the city's interests.

4. Estimated Broad Street subway earnings under this agreement are about $2,500,000 net for 1929, first year of full operation, or about 2.8 per cent on the total cost, $89,000,000, leaving about the same amount to be paid, at the start, out of taxation.

5. Broad Street subway is strategically located on the city's main traffic artery. North Philadelphia already holds over half the city's population and is growing in population and housing more rapidly than any other district. Nearly 700,000 people, or two-thirds of this district population, live within the time-saving zone of influence of this subway and its feeder lines.

6. P.R.T. revenue has increased nearly $8,000,000, or 18 per cent, in the two years following the last fare raise, and total traffic in 1926 was the highest in the history of the company, also revenue traffic (excepting post-war peak year, 1920.)

7. Company is relieved of financial responsibility of building and operating city lines and, as the city's operator, receives compensation commensurate with the magnitude of such operations.

8. The trial term ends in 1936, the city then having right to review and termination; likewise every fourth year thereafter. Term of agreement ends 1957.

9. Extensions covered during the trial term relate only to those authorized by referendum, i.e., Broad Street terminals and Walnut-Darby lines; other desired extensions to be included by mutual agreement.

10. Recommended: Frankford elevated lease, under existing, practical conditions, may stand as it is, separate from the Broad Street agreement, but if by mutual agreement it can be made fully coterminous therewith, including right of review, this should be done so that some of its minor features may later be clarified. The non-standard track gage and size of cars and the physical connection with Market Street indicate the reasonableness of this course.

In a 450-page report filed at Harrisburg, Pa., on Nov. 15, following an exhaustive survey of the Philadelphia transit needs, Dr. F. Herbert Snow, chief engineer of the Public Service Commission, recommended the expenditure of $77,995,000 by that city to improve rapid transit facilities. Dr. Snow's investigation was begun in January.

Construction of a double-deck highway on Chestnut Street, one of the principal shopping thoroughfares, by building underground side passageways at a cost of $5,000,000 along the projected subway, was one of the engineer's recommendations. He suggested that this subway should be extended westward under the Schuylkill River to about 37th Street, and that surface railway lines should be placed underground on both Chestnut and Walnut Streets.

Addition of 100 cars to the Market Street - Frankford subways - elevated lines, construction of an underground pedestrian concourse around the City Hall, and elimination of parking in the center of the city were urged.

Strong Bid for Business by Akron-Cleveland Cars

On Nov. 1 the running time of interurban electric cars of the Northern Ohio Power & Light Company was reduced to an hour and a quarter between Akron and Cleveland. Just one hour and fifteen minutes from the Akron terminal to the downtown district—Ninth and Prospect—Cleveland. The company points out that under the crowded conditions of the highways between Akron and Cleveland it is practically impossible to make the trip by auto in that time.

Limited cars leave the Akron Terminal station hourly at ten minutes past the hour every day in the year. Most of the equipment in service is of the parlor car type. An appeal by the company to the public says:

You may read or smoke in comfort from one end of the journey to the other—and the trip costs but $1 each way.

The safe way to go—millions of miles operated without injury to a single passenger!

Abandonment Impends

Threatening situation in Schuylkill County over wage and one-man car dispute. Company unable to meet obligations

RECEIVERS Shay and Evans have announced that they will operate the cars of the Schuykill Railway as soon as the men come back to run them; that unless public sentiment puts an end to the strike the trolley service will stop—not for a few weeks but for all time. In such language were the workers and the business people of Schuykill County advised of the present status of affairs in the cities of Pottsville, Frackville, Shenandoah, Girardville, Mahanoy City and Ashland, Pa., beginning with a wage dispute, leading to a walkout of the men on Oct. 1 and resulting, in the opinion of the receivers, in the probable cessation of service in the northern half of Schuylkill County.

Depression in the anthracite field, loss of traffic and resulting loss in revenue have played their parts in the financial and operating breakdown of the Schuylkill Railway, which was trying, it claimed, to pay a superfluous number of men an impossible wage. In 1924 an arbitration board awarded the trolley men an increase of from 55 cents an hour to 63 cents, a wage the receivers said did not take into consideration their ability to pay. The following year the revenue of the company dropped $100,000. When things began to look pretty somber the company asked the men to help by accepting a slight cut in their wages and to operate one-man cars. The men refused to consider these changes and voted to turn the request down flat. Later, after petitioning the Public Service Commission, permission was granted the company to abandon two-man operation and adopt one-man operation provided the cars were equipped with safety devices. Cars so equipped have passed inspection and have been approved by the commission's engineers.

The closing of the books for the six months ended June 30, 1927, showed that the company had failed to make operating expenses. Accordingly on Aug. 1 the company again gave notice to the men of its desire to amend its contract with them by cutting out the provision that all cars must be operated by two men and by establishing the Pottsville wage rate, which was 2 cents an hour less than that fixed by the arbitration board in 1924. The local countered by demanding an increase in wages from 63 cents to 70 cents and other concessions that meant more money.

Receivership quickly followed the company's default on its bond interest with an order to the receivers to operate the company for six months and report to the court whether the company could continue thereafter to give service to the people. Later a labor representative in conference with the company intimated the possibility that the men might concede the company's right to run one-man cars if a wage of 70 cents an hour were paid for that service. This proposal and that of arbitration the receivers were forced to reject.

The receivers state that they have reason to believe that those trolley men whose seniority will entitle them to the operation of the one-man cars opposed the strike and are willing to work on the Pottsville rate, but that they were outvoted by the junior men. They also think that if they can effect the desired economy of operating one-man cars at the same wage rate as prevails on other connected railway operations in the territory there is reasonable hope that under the protection of the court they will be able to "reinstate the company on a continuous operating basis."

Accomplishments in Kansas City Explained

Public opinion as expressed by the newspapers and business interests in Kansas City, Mo., seems to regard the changes in the organization of the Kansas City Public Service Company more favorably since the election of Kansas City men to the directorate. Sentiment was against the resignation of W. G. Woolfolk as president before the meeting held recently, there being some fear that the promises made to the public of the city while Mr. Woolfolk was in charge might not be carried out. The public seems reassured, however, by the brief statement issued by the board of directors after the recent meeting in which it was said that "it has been ordered by the board that budgets and plans for the 1928 improvement program be prepared by the officials of the company in collaboration with William G. Woolfolk's organization with a view to expediting the program as much as possible." The new board is to meet monthly, a new practice in the functioning of Kansas City railways.

Mr. Woolfolk, retiring president, announced that the company's officials, directors and owners could count on his co-operation and advice whenever asked. Mr. Newman, in a formal statement to the press, reiterated his viewpoint that the principal object of the railway was to give service, good service, to the public; the whole organization, from the employees up to the president and owners, is to make this its objective.

While the railway was committed to expend $6,600,000 by its franchise over a three-year period, the Woolfolk organization encompassed about $3,000,000 in new work in a year. About $1,250,000 went into almost 27 miles new track, $1,000,000 went into rehabilitation and modernization of street cars, coupled with the installation of one-man operating features, and $250,000 went into the rehabilitation of the Eighth Street tunnel, with a new approach, and the Mill Creek parkway viaduct.

For the "Eighty Per Cent"

WHEN the Philadelphia Rapid Transit Company, as it does in the circulars now being distributed, pleads for a square deal for the 80 per cent of the population using the street cars, the elevated and the subway trains, it is saying a word for "number one" at the same time. But the interests of rider and company are identical in this case, as the causes which work delay to the cars operate to the serious disadvantage of both. In pointing out in graphic form to the car riders the many reasons for the interruption of service that are wholly beyond the control of the P.R.T. management, the company is waging a useful educational campaign. It is human nature to "damn the transit company" when the cars are delayed or run in bunches or are desperately overcrowded. But at the same time it is only fair to remember that these delays affect the revenues of the company as well as cause inconvenience to the public and that it is to the company's interest to run its cars as regularly as possible. — *Philadelphia Public Ledger.*

Market Street Property Purchase Recommended

Purchase of the Market Street Railway lines by the city of San Francisco, Cal., for $20,000,000 is advocated in a voluminous report to the Board of Supervisors by Delos F. Wilcox. Purchase of the California Cable System for $1,000,000 also is recommended.

The report shows that if the railway declines the offer of the city it may be compelled, when franchises begin to expire at the end of 1929, to rip up tracks and repave scores of miles of city streets. Dr. Wilcox declares that the Market Street Railway at the present time is running about $650,000 a year short of a 7 per cent return on $26,000,000 on 47 lines. Only twelve lines and three cable lines are earning 7 per cent. Elimination of non-paying lines and drastic economies are necessary, he claims, in order to keep the basic fare at 5 cents, warning being given that the city must not be too confident of defraying the purchase cost out of earnings. Retention by the city of expert engineering advisers to study the consolidation problem also is urged.

In arriving at the $20,000,000 figure, Mr. Wilcox believes that the Market Street lines, as they exist today, have depreciated 30 per cent and the company's franchises are worth nothing to the city in money; also miles of present trackage should be scrapped and the repaving, in the event of purchase of the lines, should be done by the city. Assailing the suggestion of the company that some of its major franchises will not expire until 1932, Mr. Wilcox declares that the city should not contemplate competitive operation after 1929 on "fag ends of routes."

Fare Innovations in Oakland

Commission order stresses need for rates to enable company to meet auto competition

MARKING a distinct innovation in the fixing of fares for an electric railway, the Railroad Commission of California on Nov. 11 issued an order to the Key System Transit Company to establish an experimental 5-cent basic fare in the East Bay district.

As indicated briefly in the ELECTRIC RAILWAY JOURNAL for Nov. 12 the fare plan provided for in this decision fixes a 5-cent ride at all times within a central area bounded approximately by 40th Street, Moss Avenue, Excelsior Boulevard, Chicago Avenue, Eighth Avenue and the Oakland waterfront. Also a 5-cent ride in the area lying between the central district and the county line on the north, San Leandro on the east and Alameda on the west is provided. The commission's order was issued as the result of a series of hearings conducted by Commissioner Clyde L. Seavey and investigation by the Engineering Department of the commission.

Perhaps the most unusual feature of the decision is the provision that during the off-peak hours between 9 a.m. and 4:30 p.m. a "bargain" 5-cent fare will be in effect between all points inside the larger area in which a 7-cent fare is now charged.

In order to give the regular rider the advantage of a low fare in the entire present 7-cent area, a weekly pass, good for an unlimited number of rides during the week in which it is sold, is ordered to be sold for $1. This weekly pass will be transferable and good for the use of the holder. The principle underlying this experiment recognizes the necessity of providing attractive rates by which the public is encouraged to make more use of street car transportation during off-peak hours and to enable the company better to meet the competition of the privately owned automobile.

The commission finds that one of the contributing factors to the decline of railway patronage is lack of comfort, which is combined with slow speeds and other similar features. It is expected that the company will take advantage of these experimental fares, combined with a program of distinct improvements in the service and an application of aggressive merchandising methods greatly to augment patronage.

The commission's engineers have estimated that the rates ordered will actually decrease the company's revenue nearly $400,000 a year as applied to the present riders, but they point out that if the reduced fares proposed will double off-peak patronage, the company can be placed upon a paying basis. The effect upon the existing riders is stated by the engineers to be as follows:

A reduction from 7 cents to 5 cents cash for 70 per cent of the riders, a reduction from 7 cents to less than 5 cents on the average for 18 per cent of the riders (this being the number that it is expected will make use of the weekly ticket) and an increase from 7 cents to 10 cents for 12 per cent of the long-haul riders using peak-hour facilities.

On transbay fares, the order provides for a reduction in the one-way fare to 20 cents and an increase in the monthly commutation ticket to $6. A new form of ticket is ordered to be sold at $5.50, good for weekday riders only.

As a basis for fixing the rates, the commission made a finding of value of the Key System Transit Company's properties of $29,101,063. This compares with the company's claimed value of $32,123,362.

The commission also found that the Key System Transit Company should have its net income increased approximately $1,000,000, holds to the opinion that nearly half of this additional amount can be obtained through operating economies.

Five-Cent Shuttle Line in Seattle

A 5-cent fare is scheduled to go into effect on the municipal railway system in the downtown district of Seattle, Wash. The City Council utilities committee approved the plan of D. W. Henderson, superintendent of railways, for operation of shuttle cars between Jackson Street and Virginia Street, on First, Second and Third Avenues, during the off-peak period each day, the hours between 9 a.m. and 4 p.m. The plan is to be tried for two months in the belief that it may induce people having short trips to make through the business district to use street cars instead of walking. The 5-cent fare will hold only on these shuttle cars, and will not entitle the passenger to a transfer. The cars will operate up First Avenue to Virginia and back on Second Avenue to Jackson and up Second Avenue to Pike Street and back on Third Avenue. The cars on which the 5-cent fare applies will be designated by special signs.

One of a Series of Ads with Strong Rider Appeal

We Can Save You Money Every Day!

YOUR automobile is a very desirable convenience to have. However, if you are driving it to the office every day, or to your shopping, at a cost of at least ten cents a mile, we can save money for you.

BY using the street car you can make the whole trip for a few cents. A weekly pass for $1.25 will permit you to ride the cars as often as you wish for a period of seven days. Five tokens may be purchased for 35 cents, and school tickets may be bought in strips of ten for 40 cents.

THIS little detail of saving a bit each day is the whole basis of thrift and the beginning of that independence we are all hoping to feel later in life.

WHEN you ride the street cars, you are practicing thrift in the most systematic way, because it insures you a DAILY SAVINGS for your bank account.

WE appreciate your patronage and again offer our service to save you money.

JACKSONVILLE TRACTION COMPANY
J. P. INGLE, Manager

A promise from Jacksonville

Litigation in Seattle Ended

Handing down two decisions, Judge Frank S. Dietrich of the United States Circuit Court of Appeals on Nov. 11 dismissed litigation involving the Seattle Municipal Railway system, Seattle, Wash. Both suits, in which the city of Seattle appeared as the defendant, were the outgrowth of the situation which developed last January when the Seattle railway system went on a warrant paying basis and funds were transferred to New York to meet bond obligations.

In the first suit, that brought by the Puget Sound Power & Light Company against the city of Seattle, the "specific performance" case was dismissed when Judge Dietrich sustained the motion of the city. In dismissing the action, Judge Dietrich declared that there was "no averment that the city is wasting or mismanaging the railway property or applying or threatening to apply any of the gross revenues of the system to any purpose other than payment of outstanding bonds and operation and maintenance." John G. Von Herberg, who had appeared in the suit, had contended that the expenses of operation and maintenance of the system had a prior lien on all gross revenues. This contention was not sustained.

Judge Dietrich at the same time refused to take heed of the demand of the Puget Sound Power & Light Company that it lay down a specific rule whereby the city should every day set aside a certain portion of the receipts to meet the bond requirement. If the city has the right, the court held, it also has the right to set aside the necessary funds in a lump sum. "The court cannot attempt to impose a specific rule," it held. This action was dismissed with prejudice.

The second case, that of John G. Von Herberg against the city of Seattle, is one in which the Puget Sound company was made a cross-defendant along with Mr. Von Herberg. This suit was started by Mr. Von Herberg in the state court to enjoin the city from transferring funds to New York until after it had paid outstanding warrants for operation expenses. The case was removed to the federal court. Attorneys for Mr. Von Herberg sought to have it returned to the state court for trial. A motion for dismissal made by the Puget Sound Power Company and the city was sustained.

Route Changes in Pine Bluff

During these autumn months rerouting has been in force on the lines of the Arkansas Power & Light Company in Pine Bluff, Ark. The changes will make it unnecessary for passengers to embark and disembark in an unprotected zone and will enable the company to give more satisfactory service. This it is trying to do, as evidenced by its motto, "Helping Build Arkansas."

Cleveland Appears to Face Fare Increase

An increase in fares to 8 cents appears to be presaged by the announcement of Paul E. Wilson, vice-president of the Cleveland Railway, Cleveland, Ohio, that an unprecedented drop in October car riding was expected to throw the company's interest fund below $500,000. Dropping of the interest fund, or fare barometer, below the $500,000 mark is *prima facie* evidence, Mr. Wilson said, that a fare increase is needed.

Figures on the company's income for September will be released at the monthly board of directors' meeting and will show according to Mr. Wilson, that the interest fund was still above the $500,000 mark at the end of that month, although it decreased from $540-,000 during September.

The usual fall increase in passengers, however, has failed to materialize so far, Mr. Wilson said, and indications are that October will be no better from a financial standpoint than the preceding month. He is reported to have said:

While the fact that the interest fund drops below $500,000 is evidence "on its face" that a fare increase is needed, it is not any assurance that a raise will be made. The trend of car riding may be in an upward direction before long, in which case fare might not be raised.

Is Lord Ashfield Spoofing Big Bill?

A London dispatch says that despite the anti-British sentiment of Mayor Thompson of Chicago, Lord Ashfield, head of the London Underground system, has accepted the invitation to attend the opening of Chicago's subways and will be among the guests to make the first official trip through the system.

Cheap Sunday Rides in San Francisco

A new bargain in the form of a 24-hour ride on Sundays for 20 cents is being offered by the Market Street Railway, San Francisco, Cal., on its city lines. Tickets will be accepted in lieu of nickels on most all car lines.

Transport Survey in Grand Rapids Shopping District

To determine the actual number of downtown store patrons who are using the automobile in Grand Rapids, Mich., as a means of transportation to the loop or business district, James Sinke, Director of Public Safety, and the Grand Rapids Association of Commerce, with the co-operation of sixteen of the leading stores, started a survey on Nov. 14, with Miss Inez Miller of the Association of Commerce in charge. This is the first survey of the character to be made in Grand Rapids since the traffic congestion caused by autos has become acute and is expected to result in the electric railway receiving more consideration in dealing with traffic issues and conditions, where heretofore attention has practically been centered wholly in meeting the needs of the autos.

Every service to shoppers in the business district is represented, so the survey will not only be far reaching, but it is hoped convincing. In each of the stores represented employees specially designated will have charge of the ballot boxes and ballots, counting these ballots hourly and totaling them daily for a period of one week during the campaign. Customers to the stores will be asked to designate by their ballots how they came to the store, by auto, taxi, by street car or on foot.

Convincing Proof that "It's Great to Be a Georgian"

Impressive, indeed, is the 1927-1928 year book of the Georgia Power Company, Atlanta, Ga., presented as the company says, "to tell briefly the story of the company, and also to furnish information about the state's agricultural, industrial, educational, climatic and other advantages."

This is too modest a statement by far. The booklet, one of 54 pages, is beautifully done in colors. Many of the reproductions, especially that of the Blue Ridge scene at Lake Tugalo, deserve a permanent place in the library of the collector of prints.

The subjects covered by the contents are listed in the following order: History, hydro-electric properties, interconnecting power system, other properties, industrial map of Georgia, territory served, recent improvements, Georgia's resources, labor, education and recreation, and the new South.

The Georgia Power Company, operating company for the Georgia properties of the Southeastern Power & Light Company, really is a recent enterprise. Included in the group consolidated to form the new company were the Athens Railway & Electric Company, Georgia Railway & Electric Company, Georgia Railway & Power Company, East Georgia Power Company, Rome Railway & Light Company and the constituent Georgia Power Company, the last named including properties formerly belonging to the Athens Gas, Light & Fuel Company, Georgia Southern Power Company, Georgia Utilities Company, and Milledgeville Lighting Company.

The story of the new company's constituent properties is a history of three-quarters of a century of progress in rendering public utility service, including railway service, to Georgia, which has reached a new peak in the formation of the Georgia Power Company.

As a handbook the new volume would appear to be indispensable to editors and others interested in having at their command a source book of reliable information. Moreover, the publication carries conviction that the phrase is well deserved which proclaims: "It's Great to Be a Georgian."

Closer Co-operation of Steam and Electrics Urged

The Indiana State Chamber of Commerce, following a meeting of the traffic managers of 60 of Indiana's largest factories recently, issued a statement in which the chamber advocates more physical connections between the electric and the steam roads of Indiana. John E. Frederick, Kokomo, president of the state chamber and a big shipper, said the interchange of freight not only would aid the electric lines, but, with a lower freight rate, would bring new industries to the state, thereby providing the railroads with increased business in Indiana. He said:

Unfortunately in most instances the electric lines paralleled the steam roads and for a time thrived on the passenger end of the business, which in the beginning was the sole source of revenue. With advent of the automobile and bus, the passenger business for the most part has been diverted to these other two agencies. Prepared only for short hauls, little attention was paid to the revenues that might be derived from freight.

The freight and traffic committee was asked to pass upon exhibits that will be offered before the Interstate Commerce Commission in the Western class rate case by the chamber. The case, as viewed by Indiana shippers, is one of the most important of the year.

Extension of One-Man Car Service in Memphis

One-man cars are now operated on all Memphis, Tenn., lines, with the exception of the Wellington Street line, it is announced by the Memphis Street Railway. The cars have been installed gradually so that the elaboration of the service has made it unnecessary to curtail the force of trainmen in the employ of the company.

Advertising Campaign in Portland

For the past six weeks the Portland Electric Power Company, Portland, Ore., has been reaching its patrons through an educational and good will advertising campaign conducted in the newspapers and displayed in all cars. The messages tell the safety record of the company and give some of the operating statistics. Other ads discuss parking, the private car and the bus service supplied by the railway. Still others stress the service slogan of the employees.

The layouts of the advertisements are striking and their messages appealing. This advertising is definitely tied around the celebration of the past twenty years of service of the Portland Electric Power Company. Copy appears once a week, alternating in Portland's four principal dailies, thus getting the company on the map four times every seven days and reaching thereby every one who reads a newspaper.

Detroit Traffic Survey Presented

Detroit has the traffic survey for which the city paid $30,000 or more. The engineering force operating under Arthur T. Waterfall, third deputy police commissioner in charge of traffic, has completed its study and submitted its findings to the Common Council. Numerous suggestions have been made to improve the present congestion. Some of these have been placed in effect. The express service on Jefferson Avenue is one of the suggestions made by the engineers.

The proper use of alleys for traffic, illumination, street widening, right and left turns, one-way traffic and a number of other important subjects are fully covered by the report and suggestions. All of those subjects directly affect taxes and the accessibility of places of business throughout the city and in consequence, says the *Detroiter,* published by the Detroit Board of Commerce, the business men are deeply interested in what use will be made of the report, "now that we have it."

A committee of the Detroit Automobile Club, the appropriate body to assume the task, has taken up a study of the report. Acknowledging this committee's leadership in this effort the Board of Commerce is firmly in support of its work and stands prepared to cooperate to the utmost.

Relieving Traffic in Salt Lake City

The Utah Light & Traction Company, Salt Lake City, Utah, has installed the system of double berthing, double loading and double dispatching its cars at each intersection on Main and State Streets, between Fifth South and South Temple Streets. This eliminates the old plan of one car at a time being loaded at intersections. By loading two cars at a time it has also done much to speed up auto traffic through the city. Police officials and officers of the railway declare that this is the biggest single move to relieve Salt Lake City's congestion that has been made for a number of years.

Houston Parades Old and New Equipment

In a gala parade through the city streets the various stages of advancement made by the Houston Electric Company, Houston, Tex., were shown on the occasion of the arrival of twenty new street cars and two new buses. A reconstructed mule car led the procession, followed by dinky cars and other models which came into use as improvements were made in street car construction, and finally ten of the new cars, which represent the last word in electric railway equipment.

The twenty new street cars, in connection with the two new buses, represent an outlay of about $380,000 and constitute the first move of the Houston Electric Company in rehabilitating its equipment, as outlined by the management last spring following the readjustment of fares. Plans and specifications of these cars are shown on page 969 of this issue.

Baltimore Fare Hearings to Be Resumed

Hearings on the application of the United Railways & Electric Company, Baltimore, for authority to increase the fare from 7½ to 10 cents will be resumed by the Maryland Public Service Commission on Nov. 21. The hearing was to have been resumed on Nov. 15, but there was delay in the preparation of exhibits. The United has completed its evidence.

Electrification Report Denied

Reports originating in Wall Street that the Pennsylvania Railroad had completed plans for the electrification of its lines between Pittsburgh and Altoona have been denied by President W. W. Atterbury. He said:

> There is no truth whatever in the report. We have no such plans under consideration.

Press dispatches from Pittsburgh had made it appear that plans for electrification of the Pennsylvania Railroad between Pittsburgh and Altoona had been completed and that inquiries for electrical equipment had been given to leading electrical manufacturers. It was said 650 locomotives would be required. The report that has now been denied said:

> Heavy grades over this section have always been a serious operating problem which makes electrification advisable. Engineers have been studying the project for more than a year.

Free Rides in Logansport

"Keep Your Fares" was the slogan of conductors of the Indiana Service Corporation in Logansport, Ind., when the Wiler & Wise store leased the entire car service from 8 o'clock to 10 on the morning of Nov. 2. The public was invited to ride the cars free so that all might attend the Wiler & Wise anniversary sale and so that people would not have the burden of parking their cars. The cars carried signs advising the public of the plan and also advertising the Wiler & Wise sale.

Weekly Passes Proposed for Halifax

The application of the Nova Scotia Tramways & Power Company, Halifax, to the Board of Public Utilities to do away with the monthly permit system, under which a passenger, for $1, pays 5 cents per ride for a month and to substitute therefore a weekly pass system whereby the payment of $1.50 would entitle the holder to ride as often as he likes that week without further payments, is before the Utilities Board.

Hocker Line Receives Help

That real progress in the reorganization and rehabilitation of the Hocker interurban line, serving the Merriam-Shawnee suburban district, is being made was indicated on Nov. 9 when Herman Sonken asked Powell C. Groner, president of the Kansas City Public Service Company, to leave rolling stock to the road. Mr. Groner assured Mr. Sonken that the Kansas City Public Service Company would co-operate in every way and agreed to lease cars to the suburban line.

Mr. Sonken of Sonken & Galamba purchased the Kansas City, Lawrence & Topeka Electric Railroad at a receiver's sale for $20,000. Since the sale, former patrons of the line have realized its value. Now W. K. Paul, former general manager of the line, is attempting to finance its rehabilitation by floating a $65,000 municipal aid bond issue for the road.

Mr. Sonken said his firm would wait for its $20,000 until the road was able to earn money and pay it. The committee that is seeking to restore service over the road has an engineer at work surveying possible freight business.

Franchises to Be Offered for Sale in Richmond, Cal.

Three electric railway franchises which were applied for by the Key System Transit Company, Oakland, Cal., for operation in Richmond will be advertised for sale and let to the highest bidder on the night of Nov. 28. The franchises are to run for a period of 50 years.

Appearance Appeal in Washington

To compete with the brilliant colors with which automobiles are now being adorned the Washington Railway & Electric Company, Washington, D. C., has decided on some material changes regarding its own color scheme. As an experiment, a two-man car operated on the line of densest traffic has been decked out in dark red and cream as a departure from the standard "Pullman" green.

The red has been used on the side panels below the belt rail and the cream above the belt rail, creating a streamline appearance, while on the interior the ceiling and dash have been white enameled. This car has been operated only a short time in its new colors, but it has attracted much attention and a score or more letters have been received complimenting the company on the idea.

The company is now considering whether it would not enhance the attractiveness of the cars and assist in identifying the various lines to use different color schemes on the different routes. A start already has been made in this direction by varying the colors of one-man cars. These present an attractive appearance with a dark blue base and cream upper structure. The buses are also arrayed in cream and blue.

Recent Bus Developments

Express Experiment in Detroit to Be Applied Liberally

A tentative plan for extending the express system to make it general for the principal lines of the Detroit Department of Street Railways has been announced by Del A. Smith, general manager of the department. The proposed plan provides for using the present car and bus equipment with additions instead of substitutes. The general manager, the announcement states, believes that the program, if adopted, will help to solve Detroit's transportation needs. It is estimated that the expenditure of $6,000,000 devoted mostly to building new tracks, would provide a means of taking care of a population of 4,000,000.

It is cited that the existing express service on Jefferson Avenue shows what can be done on other lines. Referring to the newly inaugurated express service on Jefferson Avenue, Mr. Smith pointed out that the department's buses take care of local passengers. This enables the street cars to increase their running speed to 18 m.p.h. Thus in making the express service general throughout the city, Detroit could approximate rapid transit on the surface and avoid the expense of building elevateds or subways.

The plan would do away with the necessity of patrons on the express lines walking one or two blocks to the nearest street car stop. The buses operated in conjunction with express cars as they are now operated on Jefferson Avenue would pick up passengers at the first corner. The announcement states that the new plan could be fully installed within three or four years to include bus service and express service on twenty or more lines, covering such main arteries as Woodward Avenue, Grand River Avenue, Gratiot Avenue, Fort Street, Mack Avenue and the crosstown lines. The present routes in most cases would be extended to the city limits.

Express service is to be started on Grand River Avenue within the next month or six weeks. The Grand River line is a part of the former Jefferson-Grand River line, which was divided when express service was started on Jefferson Avenue.

Richmond-Seven Pines Line Seeks Permit

The Sandston Electric Railway has applied to the Virginia State Corporation Commission for permission to operate buses between Richmond and Seven Pines, via Williamsburg Road. The case was set to be heard on Nov. 16, but the taking of testimony has been postponed until Jan. 17. The application is opposed by the Virginia Electric & Power Company and the Peninsula Transit Corporation, both of which operate transportation lines along the Williamsburg Road.

A similar petition was filed with the commission last winter by the Sandston company, but was finally withdrawn by the applicant on March 2, 1927. The Sandston company wants to operate a bus line connecting with its electric line at Seven Pines. No charge is to be made for transfers from the electric cars to buses, and vice versa. Oliver J. Sands, president of the American National Bank & Trust Company, Richmond, is president of the railway.

No Authority to Regulate Springfield, Mo., Buses

The application of the Springfield Traction Company for an increase in rates for buses operated in Springfield, Mo., was dismissed by the Missouri Public Service Commission on Nov. 4, on the grounds that the state commission was without authority to regulate the rates of bus companies operated within a municipality. Buses are used to supplement electric railway service.

The ruling has been interpreted to mean that St. Louis will have exclusive jurisdiction over the rates, service and routes of the People's Motorbus Company and the St. Louis Bus Company, an auxiliary of the United Railways. The state commission did claim exclusive jurisdiction over bus lines using state highways which merely have terminals or a minor part of their routes within a city.

Bus Substitution Between Moline and Davenport

In a permit just granted by the United States government a motor coach service operating across Rock Island Arsenal between Moline and Davenport will be substituted for the present arsenal stub car line. The new service, to be installed by the Tri-City Railway, will go into effect about Dec. 1, when the equipment, now being built, will be ready for delivery.

Under the new arrangement special fares have been established. The present tripper service by railway in the morning and noon hours on Saturday and in the morning and evening hours on other weekdays to serve arsenal workmen will be continued as at present with no change in fare rates. All track connections and facilities will be kept in serviceable condition so that at any future time when the work at the arsenal requires, additional rail service can be introduced as considered necessary by arsenal authorities.

It is stipulated in the permit issued by the federal authorities that the service shall be in accordance with rules and regulations established by the commanding officer and that coaches and equipment be subject to his inspection at all times.

Hearing on New York Bus Petition Nov. 22

Discussion of the financial plans of the Equitable Coach Company, New York City, was renewed after it was announced at a Transit Commission hearing on Nov. 11, with Commissioner Leon G. Godley presiding, that Godfrey Goldmark had withdrawn as counsel for the company. Charles M. Travis, representing the company, obtained an adjournment of the hearing until Nov. 22 to permit new counsel for the company to study the case.

The Equitable Coach Company has an application pending before the Transit Commission to operate buses in all New York City boroughs except the Bronx.

J. H. Pardee, president of the Equitable Coach Company, Inc., made the following statement on Nov. 16:

We wish to take this opportunity to deny emphatically that the Equitable Coach Company, Inc., has had or contemplates having any negotiations with B.-M. T. interests relative to the selling of the Equitable Coach Company, Inc., as was reported in the morning papers. The Equitable Coach Company, Inc., wishes to reassure the people of New York City that they are steadily going forward with their plans looking toward giving the most modern and up-to-date motor coach service in the world and not a minute is being lost in the perfecting and carrying out of these plans, notwithstanding the many obstacles being placed in our way.

The Tompkins Bus Corporation, which obtained a franchise to operate buses on Staten Island from the Board of Estimate last summer, and which now is seeking a certificate of convenience and necessity from the Transit Commission, will be required to furnish detailed information on the company's financial standing at the next hearing before the Transit Commission on Nov. 25.

Reprint from "Bus Transportation"

"Maintenance Costs and Accidents Reduced by Training of Drivers" is the title of an eight-page pamphlet reprinted by the Northern Ohio Power & Light Company, Akron, Ohio, from the October issue of *Bus Transportation*, one of the McGraw-Hill publications. The article discussed the results accomplished by the schools for operators maintained by the Northern Ohio Power & Light Company.

Talk of City Run Bus Lines in St. Paul

The St. Paul City Railway, St. Paul, Minn., a part of the Twin City Rapid Transit system, appears to be threatened with competition by a city-operated bus line. The earnings in St. Paul are reported to have been inadequate in recent years and the company has made an application for increased fares in St. Paul, but not in Minneapolis. Now follows the bus prospect. City Attorney A. A. Stewart has ruled that the city

has the right to operate bus lines if it so desires. He said:

The transportation system has reached the stage where it seems to me that the city must soon give serious consideration to the question of municipal ownership of transportation facilities. We are now confronted with a complete monopoly of all forms of transportation. The city has lost practically all control of any transportation facilities serving its people. . . . I don't think the city should attempt to acquire the electric railway line or the existing bus lines. It is quite evident that the people now demand bus transportation. In my opinion that transportation should be furnished by the city itself.

Commissioner H. C. Wenzel also is in favor of city buses.

Protest Filed Against Bus Out of Kansas City

The Kansas City Public Service Company filed a protest in Jefferson City on Nov. 3 against the issuance of a certificate of convenience and necessity authorizing the White Line Bus Lines, operating between Lexington and Kansas City, to handle local traffic between Independence and Kansas City. It alleged that its 21-hour daily service was adequate and that competition from the bus company would be "unnecessary and destructive."

Rules in Maryland Under Consideration

A new list of rules and regulations covering the operation of buses in Baltimore and all other sections of Maryland is under consideration by the Maryland Public Service Commission. The subject was taken up at an informal hearing held by the commission on Nov. 9, at which the representatives of about twenty companies, including the United Railways & Electric Company, Baltimore, were present.

The commission, through its chief engineer, H. Carl Wolf, and its transportation engineer, Joseph L. Wickes, had prepared a new set of rules, which made numerous changes in those in effect, and it was on these that the hearing was held. Many of the rules prepared by the commission were acceptable to those interested, but there were a few which brought about lively discussion.

One of the proposed rules which met the greatest opposition would require all companies to make weekly reports in detail to the commission. These reports would have to show the complete daily record of each bus. Representatives of the United said a clerical force would be required to keep the record in such detail and urged the commission to modify the measure so as to make it less onerous. Others wanted the reports to be made less frequently. It is expected that out of the suggestions submitted at the adjourned hearing on Dec. 1 the commission may accept some modifications for inclusion in a revised code.

Financial *and* Corporate

No Successor Yet to J. J. Mitchell, Chicago Railways Receiver

Federal Judge James H. Wilkerson has taken under advisement a motion by attorneys representing interests in the Chicago Railways foreclosure litigation to permit Frederick H. Rawson and Henry A. Blair to continue as receivers without the appointment of another receiver to take the place of the late John J. Mitchell.

The motion, officially notifying the court of the death of Mr. Mitchell, and asking for the continuance in office of the two other receivers, was made by Attorney James M. Sheean on behalf of the receivers, and was concurred in by Attorneys Horace Kent Kenney and E. H. Cassels, representing the mortgagors.

Assignment Clause Inserted in Miami Agreement

The City Commission at Miami, Fla., has authorized the insertion of a clause in the agreement with the Miami Beach Railway which will allow assignment of the agreement to a third party. The clause specifies that the holder will be bound by the present contract and that the Miami Beach Railway is not relieved of any responsibility under the assignment. Joe H. Gill, vice-president of the Florida Power & Light Company, of which the railway company is a subsidiary, explained that all other contracts and franchises with the city had an assignment clause. Mr. Gill said that discrepancy in the present contract was found when negotiations were opened recently in New York for financing.

Southern Cities Properties Described

A booklet has just been issued descriptive of some of the properties of the Southern Cities Utilities Company. These properties supply electric light and power service in Tennessee, Alabama and West Virginia, water service in Tennessee, electric railway and bus service in West Virginia, bus service in North Carolina and gas service in southern New Jersey and Manila, P. I. The system also includes an ice company and a wholesale supply company operating in Tennessee. Since the booklet was printed the Citizens Gas Company, serving in and near Salisbury, Md., has been acquired by the Southern Cities Utilities Company. Negotiations now are in progress for the acquisition of a number of other public utilities. The principal officers of the Southern Cities Utilities Company, elected at a recent meeting, are: President, Walter Whetstone; vice-president, B. F. Pickard; secretary and treasurer, Henry W. LeBoutillier. They will serve in the same capacities for the various affiliated and subsidiary companies. The principal office of the company is located at 1612 Market Street, Philadelphia.

Foreclosure Sought on Michigan Property

Suit has been filed in the United States District Court by the Harris Trust & Savings Bank, Chicago, to foreclose on $536,000 bonds of the Southern Michigan Railway, in Grand Rapids, Mich., formerly the South Bend & Southern Michigan Railway. The Southern Michigan Railway is controlled by the Chicago, South Bend & Northern Indiana Railway.

The plaintiff asks that an accounting be made of all property, interest on the bonds from April 1, 1927, payment for services and appointment of a receiver. It especially petitions the court for an injunction enjoining officers of the railway from disposing of any of the property. The bank also asks that a trust deed be declared a valid lien and in case of failure to meet the obligation the court permit the sale of the entire property in a single parcel.

Financing by Common Stock Important

The Railroad Commission of California has denied without prejudice the application of the Los Angeles County Water Works for permission to transfer its properties to the Gardena Valley Water Company and the application of the Gardena Valley Water Company for permission to issue $125,000 of 6½ per cent twenty-year bonds at 94 and $30,000 of 7 per cent preferred stock at par and $85,000 of common stock. The commission, after reviewing the capitalization and indebtedness of the Los Angeles County Water Works, concludes that that company should be refinanced, but on a different basis than that proposed by the Gardena Valley Water Company. Among other things the commission said:

Too much emphasis is being placed on the number of times the net earnings of a property may exceed bond interest or dividends on preferred stock. It is just as important, if not more so, to capitalize a property so that it can show reasonable earnings on common stock. The records of the commission show conclusively that companies which have been able to obtain some of their construction funds from the sale of common stock have been able to sell readily bonds or preferred stock and furnish more satisfactory service.

It should also be remembered that we are not concerned here with a property to be constructed but with a property which

has been in operation for years and that the rates of the Los Angeles County Water Works have only been recently determined by the commission. It is our conclusion that the capitalization of the properties in question should bear some relation to their earnings as well as the cost or the value thereof, and that a form of capitalization which on its face seems to preclude the raising of some of the construction funds through the issue of common stock is not in the public interest and therefore should not be authorized by this commission.

$89,539 Increase in Gross Income in Kansas City

An increase of $89,539 in gross income is shown in the report of the Public Service Company of Kansas City, Mo., for the first nine months of this year, despite the fact that operating revenue fell $337,768 behind that for the corresponding period last year. Total operating revenue for the first nine months of this year is reported at $6,973,653, compared with $7,311,421 for the similar period in 1926. Operating expenses for the first nine months this year were $5,386,462, compared with $5,842,290 last year. Taxes increased from $388,350 last year to $419,500 this year.

The report states that between Oct. 15, 1926, and Sept. 30, 1927, the property earned a total income of $829,993 applicable to dividends on the preferred and common stocks of the company.

Authorized expenditures of $3,783,412 to September 30 for rehabilitation were shown; of this amount $2,776,610 has been expended. The company must spend $6,600,000 in the first three years of ownership in rehabilitation, under the terms of its new franchise.

Five hundred and ninety-two of the company's 746 street cars are destined for "one-man" operation. In explaining the change from two-man to one-man cars, the report pointed out that as a result of the change, 18 per cent more cars will pass each corner every hour. Business has increased as much as 6 per cent on some "one-man" lines.

Receivers Named for Des Moines City Railway

Company defaults in payment of principal on $700,000 of debentures issued five years ago. No changes in service or fares contemplated

C L. HERRING, prominent Des Moines business man and Democratic national committeeman from Iowa, and F. C. Chambers, president of the Des Moines City Railway, Des Moines, Iowa, were named receivers for the Des Moines City Railway by Federal District Judge Martin J. Wade.

The order of the court was issued on application of the Harris Trust & Savings Bank, Chicago, trustee for the holders of $700,000 of 7 per cent five-year gold debentures upon which payment of principal is in default. No hearing on the application was necessary, as the company acknowledged the validity of the claim of the bondholders, and gave notice that it would not contest the action.

Details Revealed in Petition

In addition to the receivership, the petitioners also asked that the property of the railway be sold to satisfy the claim of the security holders and that a writ of injunction be issued to prevent any general creditor from interfering with the operation of the property by seeking an attachment or by attempting to levy on the company's holdings.

Judge Wade granted the prayer of the bondholders in an order signed at his home in Iowa City. It dealt only with the appointment of the receivers. He is expected to submit another order soon taking up in detail the points involved in the operation of the property pending possible sale of the system.

The petition goes into detail in setting forth the grounds for action, the inability of the company to retire the debentures, and the desire of the plaintiffs that the railway property be kept intact in order to conserve the best interests of the public and the creditors.

The $700,000 of debenture bonds were issued in March, 1922, at the time of the termination of a former receivership, and as a necessary step in the restoration of the company's property to its owners. Under the order of the federal court, the company used the funds thus acquired to liquidate a deficit of nearly $600,000 which had piled up during the seventy-five days in the summer of 1921, when service was suspended. This debt was to be amortized by monthly payments from revenues of the company. After a total of $82,000 had been paid on the principal sum, the railway found revenues inadequate, and April 1, 1927, the entire remaining principal became due and was defaulted.

The debentures are junior to $4,651,000 of outstanding first mortgage bonds of the railway. As there has been no default in payment of the first mortgage bonds, the holders are not a party to the receivership action. Any sale of the property of the Des Moines company will be made subject to the first mortgage bonds.

In support of its allegation that the Des Moines City Railway will be unable in the future to satisfy the claim of the debenture bondholders, the petitioners cite the Aug. 1, last, report of the company. This shows that estimated revenues for 1927 will total $2,223,087.84 (based on figures for the first eight months of the year) and that total operating expenses and taxes will aggregate $1,934,931. Adding bond interest of $241,050 to operating expenses and taxes, the petitioners point out, will practically wipe out the net revenue, leaving only $47,106, a sum declared to be wholly inadequate to meet the company's obligations.

Some Fare Facts

This statement receives added weight by figures taken from the monthly report of the company since Oct. 1, 1925, when a 10-cent fare was adopted and children's fares were raised from 2½ cents to 5 cents, with the expectation that the ensuing revenues would be sufficient to yield an adequate return. The experiment started off with indications of success. A deficit of $73,254 in the stabilizing fund was wiped out, and operating profits were registered monthly from October, 1925, to and including May, 1926. However, the automobile aided by poor economic conditions and lack of work in the building trades, made such inroads on railway revenues that in only two months of the past sixteen have credit balances been shown, while monthly operating deficits have run as high as $27,316—the figure registered in September this year. A court decision adverse to it prevented the company from taking full advantage of the economies of one-man operation.

On June 6, 1926, the company adopted a 25-cent Sunday pass good for unlimited riding throughout the day and until 12 midnight. On Sept. 20, 1926, a weekly pass was instituted, selling at $1.25 and good for unrestricted riding for seven days. The weekly pass, which has largely superseded the Sunday pass, has reached a sale of as high as 12,000 a week, and records show it is giving the regular car patron practically a 5-cent fare. The average number of rides by pass holders is slightly more than twenty-six a week. It is generally agreed that the pass has created much good will for the company.

The value of the city railway's property is estimated at approximately $10,000,000. It was appraised at that figure in 1919, and a year later a special appraisal made by the city reduced that figure less than 5 per cent.

The receivers have announced that they will make no changes in service or fares. They are pledged, of course, to conserve the property in the interests of the public and the creditors, pending disposal of the system by the court.

Abandonment Hearing on Dec. 13

Hearing of the application of the Key System Transit Company, Oakland, Cal., for permission to abandon certain local lines in Richmond has been put over by the State Railroad Commission for Dec. 13. In view of the recent agreement reached by the city and the Key System permitting abandonment of the line to Alvarado Park, north of Macdonald Avenue, the hearing is expected to be merely a formality.

Boston & Maine Computes Costs

The Boston & Maine Railroad has made a careful study to determine the proportional cost of operating steam passenger trains, gasoline cars on rails and buses on highways. It reports that it costs $1.58 per mile to operate the train, 72 cents per mile to operate the gasoline rail cars and 28.9 cents per mile to run the motor coach. In this computation the cost of rail maintenance is not included. The gasoline rail car cuts the steam costs in half, and five motor coaches can be operated over the highway for what it costs to run one train the same distance.

The Boston & Maine has now 68 buses operating 1,000 route-miles and 40,000 total bus-miles daily, and 24 gasoline rail cars operating a total of 2,700 miles a day. It is out of these actual operations that the figures of comparable items have been developed.

The table summarizing the Boston and Maine's cost experience in direct and other comparable costs follows:

COST PER TRAIN-MILE (CENTS)

	Steam	Rail Motor Car	Bus
Wages	38.7	23.40	4.574
Fuel	23.7	10.77	3.343
Repairs	50.8	8.33	5.359
Miscellaneous	16.6	1.17	7.171
Depreciation, insurance and interest	16.5	15.88	7.243
Taxes and fees	12.6	12.60	1.265
Total	158.9	72.15	28.955

Under "Miscellaneous" are included in the case of steam trains, supplies, hostling and other engine-house and train expenses not otherwise shown. Under gasoline rail cars similar supply items, heating, lighting, cleaning and hostling, and under buses garage expenses, lighting, tickets agents and snow removal are represented. Depreciation of steam trains is charged at a rate of 2 per cent on the investment on cars, and 3 per cent on the investment on locomotives; on gasoline rail cars 5 per cent on the investment in cars and 12½ per cent on the motor, and in buses at a rate of 20 per cent.

Petition Filed for Abandonment in Mobile

The Mobile Light & Railroad Company, Mobile, Ala., has appealed to the Public Service Commission for permission to abandon its tracks on portions of Augusta, Chatham and Texas Streets. The company told the commission the cost of rebuilding its tracks on the streets which will be paved will be $44,925 and the cost of paving will be $16,559, a total of $61,485. It also said the service on the streets does not yield a return and that its franchise will expire Jan. 15, 1936. It said it would not care to renew the franchise for operation on the streets because of the losses it is now said to be suffering.

In its petition the railway set forth figures regarding its earning capacity. On its valuation of $3,765,369, which was set by the Public Service Commission, it earned $69,947 or 4.47 per cent in 1926 and during the first nine months of 1927 it earned $15,964 or 2.22 on its valuation.

Surplus Continues to Improve on Interstate Lines

The operation of the railway department of the Interstate Public Service Company, Indianapolis, Ind., showed material improvement in 1926 over the preceding year. The total gross business increased $66,444, while the net from operation showed an increase of $120,114. The bus service, both through and local, to points between Indianapolis and Seymour, continued in satisfactory operation. These facts were contained in the annual report to the stockholders for the fiscal year ended Dec. 31, 1926.

The popularity of the parlor-buffet and sleeping car service operated between Indianapolis and Louisville has been the cause of an increase in passenger revenue. A new and modern line car, constructed entirely in the company's own shops, was added to the operating equipment.

In New Albany, Ind., 8,400 ft. of light-weight track in paved streets was replaced with new 122-lb. flanged girder rail supported by steel ties and laid in concrete.

The president of the company referred in the annual statement to the plan of continuing as Christmas gifts the life insurance policies for the employees, which range from $500 to $1,500 each, depending on the years of service. The company entered upon its fourth year of the Service Annuity Fund for the retirement of employees who have reached the end of their active working years.

The public relations department continued throughout the year its policy of promoting satisfactory relations between the company and the community served. Meetings of officers, department heads, operating officials and employees of the company were held regularly. The women's committee was active throughout the year, particularly in its educational program, which covered many phases of public utility activities.

The work of the safety department was actively continued.

Abandonment in New York Sought

The Hudson Valley Railway, Albany, N. Y., applied to the Public Service Commission on Nov. 11 for permission to abandon its Thomson-Greenwich branch as of Nov. 4, because of the damage by high water at the Battenkill River, near the American Woodboard Company's plant, resulting in washing out the company's roadbed. The petition states that the recent high waters washed out about 275 ft. of roadbed from 50 to 75 ft. wide and from 23 to 40 ft. deep. To repair the washout, the petition states, would require four or five months at an estimated cost of $60,000.

The commission on Aug. 17 approved a declaration of abandonment of the Thomson-Greenwich branch to become effective on Jan. 1. The company now asks that it be permitted actually to abandon the branch as of the date of the washout.

INCOME ACCOUNT OF THE INTERSTATE PUBLIC SERVICE COMPANY FOR THE YEAR ENDED DEC. 31

	1926		1925	
Operating revenues		$9,721,901		$8,916,453
Operating expenses (including retirement reserve, $281,651)		5,965,333		5,640,094
		$3,756,568		$3,276,359
Uncollectible bills	$19,356		$27,699	
Taxes	625,197		546,255	
		644,553		573,955
Operating income		$3,112,015		$2,702,404
Rent for leased lines		165,215		171,296
Net operating income		$2,946,800		$2,531,107
Non-operating income		28,707		38,502
Gross income		$2,975,507		$2,569,609
Deductions from gross income:				
Interest on funded debt	$1,405,349		$1,264,582	
Miscellaneous interest			54,433	
Amortization of debt discount and expense	72,232		95,816	
		1,477,581	36,933	*1,451,765
Net income for the year		$1,497,925		$1,117,844
SURPLUS ACCOUNT				
Surplus, Jan. 1, 1926		$790,562		$803,544
Net income for the year, as above		1,497,925		1,117,844
				$1,921,388
Less:				
Dividends paid and accrued—				
Prior lien stock	$633,163		$584,935	
Preferred stock	366,512		222,185	
Common stock	374,025		385,416	
		1,373,700		1,192,537
		$124,224		
		914,787		$728,850
Miscellaneous credits and debits (net)		21,447		61,711
Surplus		$893,339		$790,562

* Includes dividends paid on preferred stock of Indiana Power Company to date of purchase of property.

Personal Items

German Visitor Praises Grand Rapids

Herr R. Schwanter, assistant director engineer of the Cologne, Germany, Municipal Railway, has sailed for home after a visit in the United States in which he studied electric railway operation in New York, Buffalo, Cleveland, Grand Rapids, Milwaukee, Chicago, St. Louis, Indianapolis, Pittsburgh, Washington, Baltimore and Philadelphia. He was attracted to Grand Rapids, this year's Coffin Prize winner, by the wide publicity that company and its coaches and system received. As the guest of Vice-President and General Manager DeLamarter he spent two days inspecting the local system.

It was Mr. Schwanter's opinion that Chicago handles the heaviest street car traffic best, but that Grand Rapids by far has the most attractive cars he had seen.

H. K. Williams and P. Hill of Illinois Company Transferred

Homer K. Williams, manager of the Illinois Power & Light Corporation's interests in Abingdon, Ill., has been transferred to Galva. Phillip Hill, Galesburg, succeeds him at Abingdon. Mr. Williams went to Abingdon from Irving, where he had been in the employ of the company. Mr. Hill has been engaged in the service of the company since his graduation from Knox College several years ago.

Providence Line-Up Affected

Changes in the supervisory force of the United Electric Railways, Providence, R. I., resulting from the closing of the Olneyville carhouse are as follows:

G. S. Amidon, formerly superintendent of the Olneyville Division, has become superintendent of the East Providence Division.

E. E. Hargraves, formerly superintendent of the East Providence Division, becomes assistant superintendent.

William P. St. Sure, newspaper man of Oakland, Cal., has become affiliated with the Key System Transit Company as director of publicity and advertising. His appointment was announced on Oct. 8 by Vice-President Goldsmith in charge of public relations. Besides his newspaper experience on such papers as the Fresno *Republican*, Fresno *Herald* and Oakland *Tribune*, Mr. St. Sure has also taken a prominent part in civic and fraternal affairs.

Arthur T. George, assistant attorney of the California Railroad Commission for the last two years, submitted his resignation on Sept. 13 to the commission effective Oct. 1, 1927. Mr. George will be associated with the firm of Newlin & Ashburn in the city of Los Angeles.

Corporation Expert Heads Kansas City Company

Powell C. Groner, whose election to the presidency of the Kansas City Public Service Company, Kansas City, Mo., was announced in the Electric Railway Journal, issue of Nov. 5, page 885, is best known for his untiring efforts and outstanding accomplishments on the reorganization committee of the Kansas City Railways. Here he acted as counsel and at the termination of the receivership was appointed general counsel for the present company. As a



P. C. Groner

corporation attorney for that property he established a fine reputation for himself, winning even more distinction because he is one of the youngest executives in the electric railway field.

From 1913, the date of his graduation from college, until 1922 Mr. Groner engaged in general practice in both New York and Chicago, representing the Fifth Avenue Coach Company among other concerns during that period. In 1922 he joined the firm of Newman, Saunders & Company, Inc., public utility operators and investment bankers, and has been a member of that organization since then.

Mr. Groner was born in Norfolk, Va., on Feb. 13, 1892. He received his academic and law education at the University of Virginia, specializing in corporation and public utility law.

Courtland L. Horton, Winsted, Conn., has been appointed superintendent of the Torrington-Winsted branch of the Connecticut Company to succeed the late Frank Hopkins. Mr. Horton has been connected with the Connecticut Company since 1909, serving as cashier of the branch for several years and more recently as assistant to the superintendent.

Joseph W. Hicks Gives Journalism Lectures

Joseph W. Hicks, former assistant city editor of the Oklahoma City *Times* and now connected with the publicity department of the Byllesby Engineering & Management Corporation in Chicago, has been invited by the Medill School of Journalism of Northwestern University to give a series of lectures at the night school. Mr. Hicks will lecture one night a week for sixteen weeks on editing house organs, conducting trade publications, handling sales bulletins and similar related subjects.

Mr. Hicks is a graduate of the University of Oklahoma. Two years ago he accepted an offer from the Byllesby company in Chicago to start and then to edit a publication for executives. He established "Byllesby Management."

E. E. Mitchell, superintendent of transportation of the Augusta-Aiken Railway & Electric Corporation, Augusta, Ga., has been given the additional duties of track supervisor.

Ivan Bowen has resigned, effective Jan. 1, 1928, as a member of the Minnesota Railroad and Warehouse Commission to practice law in Minneapolis. Mr. Bowen was appointed to the commission in 1921 and was renamed for the six years expiring on Jan. 1, 1929. As a member of the commission he has had to do chiefly with railroad rate matters and those pertaining to the licensing and regulation of bus and transfer lines under the new state traffic law.

J. P. W. Brown, vice-president and general manager of the Nashville Railway & Light Company, Nashville, Tenn., was recently named chairman of the Tennessee Public Utility Information Bureau. He succeeds the late Percy Warner, who was chairman from its organization in 1922 until his death in 1927.

F. Krug was recently appointed general manager of the Porto Rico Railway, Light & Power Company, San Juan, P. R. He has been serving as acting general manager.

OBITUARY

James Cox Brady

James Cox Brady, prominent financier, industrialist and philanthropist, died at his home in New York City on Nov. 10. Mr. Brady's father, Anthony N. Brady, was one of the organizers of the old Brooklyn Rapid Transit Company and his brother, Nicholas F. Brady, was president of the New York Edison Company. James Cox was the financial man for the Brady interests, while Nicholas F. assumed responsibility for the executive work

connected with the organization and merging of public utility properties. At the time of his death Mr. Brady was first vice-president and a director of the Brooklyn Edison Company and a director of the Mohawk-Hudson Power Corporation and of other industrial organizations. He was 45 years old.

Nathan J. McAloney

Nathan J. McAloney, district supervisor of the carhouse division, Pittsburgh Railways, Pittsburgh, Pa., died at his home in that city recently. He entered railway work in Denver, Col., with the Denver City Tramway, where he remained for a period of ten years as a pipefitter, car inspector and later as an air brake specialist. From Denver he went with the Emory Lubricating Company in St. Louis, Mo. Later he moved to Chicago, where he remained for a period of six years with various automobile concerns. On Sept. 17, 1918, Mr. McAloney returned to the railway industry and was employed as a car repairman for the Pittsburgh Railways at the Manchester shop. He steadily advanced and on Oct. 1, 1926, was promoted to district supervisor of the interurban district carhouses.

While employed by the Pittsburgh Railways, he attended the Carnegie Institute of Technology at night, and was graduated in the year 1923. Mr. McAloney was 49 years old.

George H. Benjamin

George H. Benjamin, industrial engineer and patent expert, died at his home in New York on Nov. 10. He was frequently retained as a patent expert and counselor by several of the large electrical companies and at one time was the sole American representative of the Siemens interests in this country. In the course of an active and unusually useful life Mr. Benjamin cultivated a diversity of interests which made him a man of many accomplishments. In addition to being internationally known as a patent expert and industrial engineer he was noted as a criminologist and had been consulted by Scotland Yard as a technical expert. He was graduated from the Albany Medical College, later practicing surgery for a period of five years. His famous library bespeaks the literary taste of a man who was a writer of talent.

Samuel W. Adler, a prominent figure in the receivership suit of the United Railways, St. Louis, Mo., eight years ago, died in his home in New York City on Nov. 8. Mr. Adler was personally a heavy stockholder and bondholder of the United Railways and in 1919 was named the plaintiff in one of the several receivership suits brought in the United States courts against the railway. It was under the Adler suit that Rolla Wells was named receiver for the company. Mr. Adler was 62 years old.

Manufactures *and the* Markets

Talk of Car Purchase Renewed at Seattle

The deal for 80 new cars for the Seattle Municipal Railway, Seattle, Wash., is expected to be completed now that the United States District Court of Appeals has handed down a favorable decision in the litigation brought by J. C. Von Herberg involving the right of the city of Seattle to make principal and interest payments to Stone & Webster for the Seattle railway system until employees of the system are paid. Mr. Von Herberg sought to have the court declare that operating expenses had priority over bond interest payments. This point the court disallowed.

About a year ago the city of Seattle, through the Board of Public Works, opened bids for this rolling stock, the St. Louis Car Company, St. Louis, Mo., submitting the best offer, $1,420,000. At this time the board awarded the contract to the low bidder, contingent upon the sale of bonds covering the purchase price. These bonds, it was stated, could not be sold advantageously until the case in the U. S. District Court was settled.

The railway department has more than 600 cars in operating condition, but D. W. Henderson, general superintendent, states that a saving far in excess of the interest on the proposed bond issue for the purchase could be made by substituting new cars for the old ones. The new cars, he stated, would be built for either one or two-man operation.

Under the agreement with Stone & Webster when the Seattle car lines were purchased from the Puget Sound Traction, Light & Power Company, the city of Seattle must pay $883,000 a year principal and interest at 5 per cent. The last payment, made in March, involved $507,041 interest and left a balance of $10,002,000 due Stone & Webster.

Center of Industry Continues Westward Movement

According to calculations recently made by the Geological Survey, Department of the Interior, the center of industry in the United States in January, 1926, was about 50 miles southeast of Chicago. This point is approximately near Valparaiso, Ind., about 170 miles due north of the 1920 center of population near Whitehall, Ind., and about 640 miles east by north of the geographic center, somewhere near Smith Center, Kan.

This determination of the center of industry is based on the capacity of steam engines, steam turbines, water wheels and internal combustion engines installed in manufacturing plants and in public utility power plants. Twice the weight is given to the power equipment in public utility plants, as it is used twice as much as that in manufacturing plants. This method is believed to give more representative results than previous determinations of the center of industry, which have been based only on the installed capacity of prime movers in manufacturing plants.

The findings of the Geological Survey show that the 1926 center of industry was 25 miles southwest of its 1918 position and approximately 75 miles southwest of the 1908 center. In other words, the total shift from 1908 to 1926 was about 75 miles in a west by south direction.

This slow movement of the center of industry during a period when the capacity of prime movers in central stations and manufacturing plants increased about 140 per cent indicates that industrial development in the United States is proceeding at about the same rate in all sections, although a trifle more rapidly in the West and South.

Consumers' Stocks of Bituminous Coal Greater

Consumers' stocks of bituminous coal amounted to 61,900,000 tons on Oct. 1, according to a survey just completed by the United States Bureau of Mines, Department of Commerce. In comparison with the final revised figure for July 1—63,400,000 tons—this is a decrease of 1,500,000 tons. On Oct. 1, 1926, the stocks were 43,000,000 tons.

Exports during the third quarter of the year were normal, averaging 351,000 tons a week. Home consumption averaged 8,360,000 tons, as against 9,050,000 tons in the similar period last year. The decrease of 7.6 per cent reflected diminished activity in the steel, automobile and other industries. With colder weather, however, the weekly consumption tends to increase and in the last quarter of 1926 it averaged 11,200,000 tons. In addition to the stocks of consumers there were 9,905,547 tons of bituminous coal on the docks of Lakes Superior and Michigan. Stocks of anthracite are fully up to normal for this season of the year.

White Motor Official to Act as Assistant to President

Saunders Jones, vice-president of the Southern region of the White Motor Company, with headquarters in Atlanta, is, according to an announcement by President Walter C. White, being transferred to the home office of the White Motor Company, where as vice-president he will act as assistant to the president.

Mr. Jones' work in the southern re-

gion will be taken over by C. B. Cowan, district manager at Birmingham, pending appointment of a vice-president.

Ohio Brass Creates New York Executive Branch

In recognition of the constantly increasing growth of the utility and industrial interests which are concentrated in the Eastern states, the Ohio Brass Company has decided to create an executive branch in New York City, covering New England and the territories served by the present New York and Philadelphia sales offices.

It is anticipated that the establishment of this executive branch will better enable the company to serve the industry in the broad sense and will develop a more intimate relationship with this large center of utility and industrial activity.

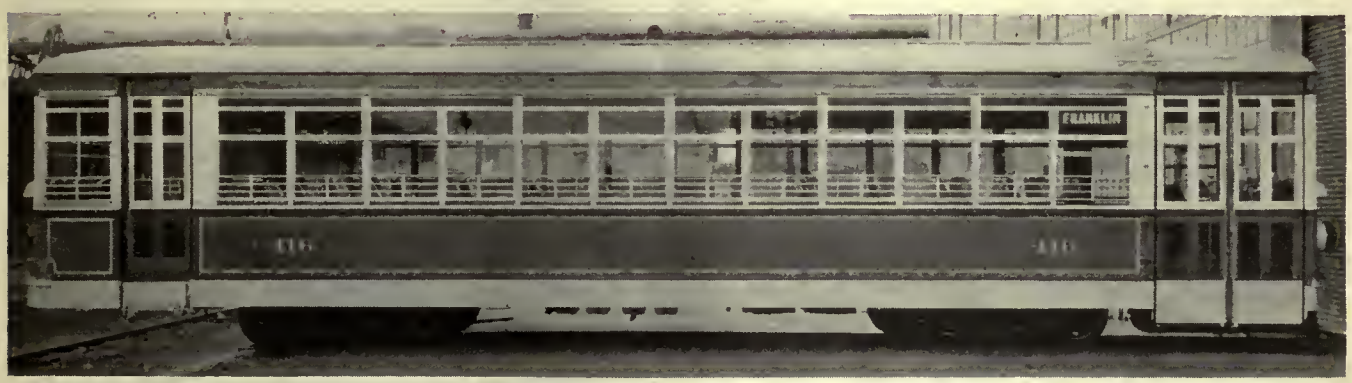
This change will be made effective about the first of the year, with Frederic Attwood in charge. Mr. Attwood is well known in the electrical industry, both here and abroad, having directed the interests of the Ohio Brass Company in Europe for several years and has recently returned to this country to undertake the organization and direction of the New York executive office.

New South Shore Passenger Station Enlarged

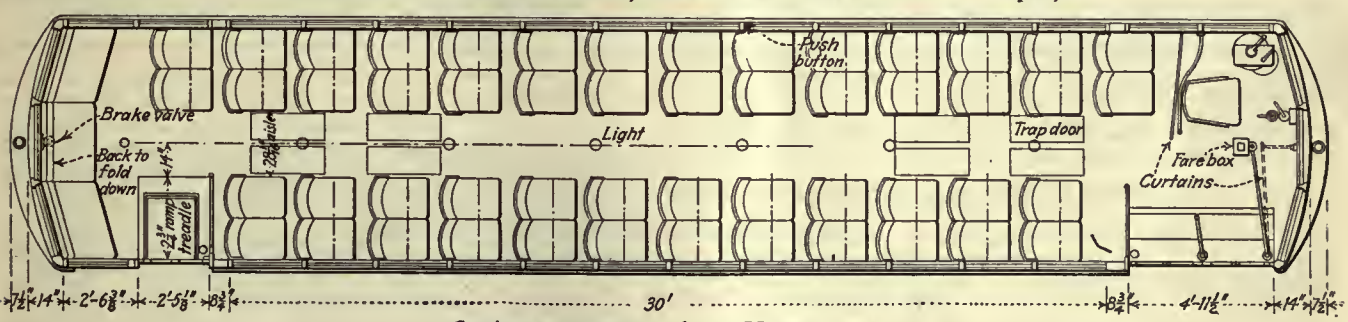
The new Chicago, South Shore & South Bend Railroad passenger station now being remodeled at South Bend, Ind., will occupy the entire main floor of the present building, 85 by 65 ft. The present station was remodeled less than two years ago, but it has become necessary, it is understood, to provide larger terminal facilities because of the rapid growth of business out of South Bend both on the South Shore and the Golden Arrow route to Detroit, Mich.

In the new floor area will be a waiting room 65x50 ft. for both South Shore

Twenty-Car Order for Houston Recently Delivered



Exterior view of one of the twenty units for the Houston Electric Company



Seating arrangement of new Houston cars

Delivery of the twenty one-man, single-end, double-truck, semi-steel cars built by the St. Louis Car Company has recently been completed to the Houston Electric Company, Houston, Tex., which is under the executive management of Stone & Webster, Inc. This order was noted in the JOURNAL for June 18.

The cars will have an over-all length of 44 ft. 11½ in., total weight of 36,000 lb. and a seating capacity for 57 passengers. The exterior color scheme is blue, cream and red and the interior trim mahogany and the fittings nickel plated.

One of the cars was on display at the convention of the American Electric Railway Association in Cleveland the early part of October and attracted a great deal of attention and favorable comment. Subjoined are specifications, released a short time ago by C. O. Birney, superintendent of car construction for Stone & Webster, Inc. It is planned to publish in a subsequent issue a more extended article relative to the reasons for adoption of this type of car and its successful introduction the early part of this month.

Number of units	20
Type of unit	One-man, motor, passenger, city, single end, double truck
Number of seats	57
Builder of car body	St. Louis Car Company
Date of delivery	Oct. 27
Weights:	
Car body	18,400 lb
Trucks	9,000 lb.
Equipment	8,600 lb.
Total	36,000 lb.
Bolster centers	22 ft. 0 in.
Length over all	44 ft. 11½ in.
Length over body posts	31 ft. 5½ in.
Truck wheelbase	5 ft. 4 in.
Width over all	8 ft. 8½ in.
Height, rail to trolley base	10 ft. 0 in.
Window post spacing	30 in.
Body	Semi-steel
Roof	Arch, canvas covered
Doors	End, folding
Air brakes	Westinghouse type B 100 per cent
Armature bearings	Plain
Axles	4 in.
Car signal system	Faraday
Compressors	Westinghouse DH-16
Conduit	Flexible, transite lined wood box
Control	K-75-A
Curtain fixtures	National Lock Washer, type C
Curtain material	Double-faced Pantasote, drapes at rear end
Destination signs	Hunter
Door mechanism	Natinnal Pneumatic
Energy-saving device	Economy meters
Fare boxes	Johnson, air operated
Finish	Enamel, blue with red trimmings
Floor covering	¼-in. rubber mosaic tile
Gears and pinions	Helical
Glass	DSAA
Hand brakes	St. Louis Car Co., drop handle
Hand straps	Sanitary
Headlights	Golden Glow, type SE
Headlining	Haskelite
Interior finish	Mahogany, nickel-plated fittings
Journal bearings	Plain
Journal boxes	St. Louis Car Co.
Lamp fixtures	Safety Car Heating & Lighting Co., center bowl type
Motors	Four Westinghouse 510-A, inside hung
Safety car devices	Safety Car Devices Co.
Sash fixtures	Curtain Supply Co., brass
Seats	Bus type, stationary
Seat spacing	30 in.
Seating material	Hyaline, analine dye, hand buffed
Slack adjusters	American Brake Co., type E
Stanchions	Aluminum
Steps	Rear folding, front stationary
Step treads	Feralun and Kass
Trolley catchers	Keystone
Trolley base	Ohio Brass, No. 45-41
Trolley wheels	Ohin Brass
Trucks	St. Louis EIB-64
Wheels	Rolled steel, 26 in.
Wheelguards	H.B., six-bar
Special devices: Variable load brake, rear door treadle, Oskelite stop signal, Bennett race sign, colored top gotbie glass, copper air pipe, and group installation, dasher flood lights, two headlights front end, skirt, back-up arrangement, Westinghouse TC-2 switch with PV-3 brake valve.	

and Shore Line motor coach passengers on the Golden Arrow route to Detroit, an outing and recreation information bureau, a ticket booth, a fountain concession, a women's rest room, men's smoking room and telephone facilities. Plans for the remodeling call for an interior much like that of the new South Shore station at Michigan City, Ind.

Copper Continues to Show Strength

The continued strength in copper, both in the United States and abroad, with good sales at higher prices, is the feature of the metal market for the week ended Nov. 16. Zinc and tin prices have also advanced slightly, though the market position of these metals does not appear so firm as that of copper.

Sales of copper in the week ended Nov. 16 have again been very satisfactory in the domestic market and considerably better than that abroad. The price for usual Eastern deliveries has advanced from 13⅜ cents to 13½ cents, the last-named quotation having been realized on heavy sales Nov. 15 and 16. A good tonnage was also sold in the Middle West at 13⅝ cents. Abroad, it is said, cable manufacturers have been heavy buyers, though they have shown little interest here recently. The foreign price continues at 13.80 cents, c.i.f., with the buying practically all for prompt shipment. An encouraging feature of the copper situation at present is that the improved market comes as the result of a bigger demand rather than decreased production; the rate of world copper production in October was the greatest in history, with the exception of February, 1927, and November, 1926, and yet world stocks at the end of that month were the lowest for a long time. In other words, the increase that has been made in total production appears fully justified.

Monotonous is the best word to describe the domestic lead market. Buying has been neither brisk nor dull; and prices have been uniform at 6.25 cents New York and 6 cents in the Middle West, at which levels a good business was done each day. The American Smelting & Refining Company continues its contract price for the New York market at 6.25 cents. It has been at this level for about two months now, a comparatively long period for recent years. Prompt and November deliveries easily predominate.

Buying at 5.60 cents, St. Louis, was heavy, galvanizers feeling that such a low price was not likely to persist, and endeavoring to buy for future requirements so far as they dared. This buying, coupled with the fact that some producers withdrew from the market, caused an upward reaction, with the result that 5.65 cents was the lowest price for the last two or three days and 5.70 cents was secured on some orders, largely for forward delivery.

The technical position of spot Straits tin has been weak since the first of November, one reflection of this being the narrow spread between Straits and metal of 99 per cent quality. The position appears to be improved somewhat, however. London advanced sharply on Monday, and this buoyed the domestic price temporarily, though consumers were not interested to any great extent. Forward shipment is at a discount of less than ½ cent.

ELECTRIC RAILWAY MATERIAL PRICES—NOV. 15, 1927

Metals—New York

Copper, electrolytic, cents per lb.	13.275
Lead, cents per lb.	6.25
Nickel, cents per lb.	35.00
Zinc, cents per lb.	6.025
Tin, Straits, cents per lb.	57.0
Aluminum, 98 or 99 per cent, cents per lb.	25.00
Babbitt metal, warehouse, cents per lb.:	
Commercial grade.	61.00
General service	31.50

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$4.075
Somerset mine run, Boston	1.90
Pittsburgh mine run, Pittsburgh	1.825
Franklin, Ill., screenings, Chicago	1.55
Central, Ill., screenings, Chicago	1.125
Kansas screenings, Kansas City	2.175

Track Materials—Pittsburgh

Standard steel rails, gross ton	$43.00
Railroad spikes, drive, ⅝ in. and larger, cents per lb.	2.775
Tie plates (flat type), cents per lb.	2.25
Angle bars, cents per lb.	2.75
Rail bolts and nuts, cents per lb.	3.90
Steel bars, cents per lb.	1.75
Ties, white oak, Chicago, 6 in.x8 in.x8 ft.	$1.45

Hardware—Pittsburgh

Wire nails, base per keg	2.50
Sheet iron (24 gage), cents per lb.	2.80
Sheet iron, galvanized (24 gage), cents per lb.	3.65
Galvanized barbed wire, cents per lb.	3.20
Galvanized wire, ordinary, cents per lb.	2.40

Waste—New York

Waste, wool, cents per lb.	14–20
Waste, cotton (100 lb. bale), cents per lb.:	
White	14–19.50
Colored	9–16

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), cents per lb.	10.6
White lead in oil (100 lb. keg), cents per lb.	13.75
Turpentine (bbl. lots), per gal.	$0.545
Putty, 100 lb. tins, cents per lb.	5.25–5.50

Wire—New York

Copper wire, cents per lb.	15.25
Rubber-covered wire, No. 14, per 1,000 ft.	5.50
Weatherproof wire base, cents per lb.	15.75

Paving Materials

Paving stone, granite, 5 in. New York—Grade 1, per thousand	$150
Wood block paving 3½, 16 lb. treatment, N. Y., per sq.yd.	$2.70
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots	51.00
Paving brick 3x8½x4, N. Y., per 1,000 in carload lots	45.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd.	1.85
Cement, Chicago consumers' net prices, without bags	2.05
Gravel, ¾-in., cu.yd., f.o.b. N. Y.	1.75
Sand, cu.yd., f.o.b. N. Y.	1.00

Old Metals—New York and Chicago

Heavy copper, cents per lb.	11.25
Light copper, cents per lb.	10.00
Heavy yellow brass, cents per lb.	7.25
Zinc, old scrap, cents per lb.	3.50
Lead, cents per lb. (heavy)	5.25
Steel car axles, Chicago, net ton	$14.75
Cast iron car wheels, Chicago, gross ton	13.50
Rails (short), Chicago, gross ton	14.75
Rails (relaying), Chicago, gross ton (65 lb. and heavier)	28.50
Machine turnings, Chicago, gross ton	7.25

TRACK AND LINE

Minneapolis Street Railway, Minneapolis, Minn., was reported a short time ago as being ready to begin operation of a double-track line on 50th Street from Bryant Avenue south to Penn Avenue, nineteen blocks, and a single-track extension on Penn Avenue from 50th to 54th Street, four blocks as a part of its Bryant-Johnson through car line. In addition the company double tracked the 50th Street line from Xerxes Avenue south to Penn Avenue, eight blocks, this season. This improvement is in operation, as part of the Oak-Harriet line, which terminates at Penn Avenue.

Carolina Power & Light Company, Asheville, N. C., started work a short time ago on the new street railway link from Broadway and College Street, westward on College to Haywood Street. Work was commenced at both ends of the proposed line and service on it will be instituted, it was expected at that time, within the next three months, as all materials to be used on the job had arrived. According to officials of the company work will be pushed to completion as rapidly as possible. The new track, it is understood, is planned for use as a cut-off link and it is expected will relieve congestion at Pack Square and permit faster schedule on all lines.

TRADE NOTES

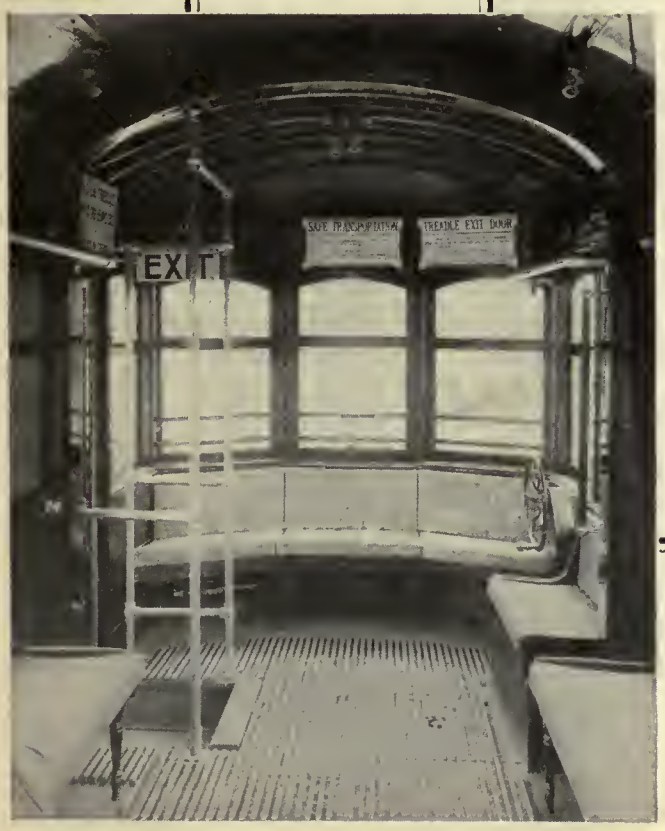
Rollway Bearing Company, Inc., Syracuse, N. Y., announces the opening of a sales offices at 956 Leader Building, Cleveland, Ohio. R. D. Faris has been appointed Cleveland district representative and will make his headquarters there.

American Engineering Company, Lo-Hed Hoist Division, Philadelphia, Pa., announces the appointment of direct factory representatives in Pittsburgh and Cleveland for the sale of its Lo-Hed monorail electric hoists. The Pittsburgh office, whose territory will include western Pennsylvania, West Virginia and counties along the eastern border of Ohio, is located in the Oliver Building, with D. A. Polhemus in charge and John Kaiser assisting. W. C. Minier, with offices at 2195 Bellfield Avenue, Cleveland, will direct sales in northern Ohio, except for territory surrounding Toledo.

American Manganese Steel Company, Inc., Chicago Heights, Ill., recently announced in a letter that it had purchased the foundry of the American Brake Shoe & Foundry Company at Burnside on the south side of Chicago. They advise that this will make their seventh foundry: that the date set for beginning operations at Burnside under Amsco Management is Jan. 1, 1928, although it may take place sooner, and that in the meantime the present customers of this foundry may be sure of entirely adequate service.

London, Ont., "Y's" cars safely through Novel use of "Peacock" Staffless Brakes!





The London Street Railway, operating in London, Ont., Canada, has all single-end control equipment and many of its lines have "Y's" at terminals. Because of increasing auto traffic it became increasingly necessary to devise some plan to back up safety cars in order that this equipment could be operated in safety around these "Y's" and without delay to traffic.

After considering many schemes, all of which were discarded, the Company finally decided to use an effective hand brake at the rear, and it isn't surprising that the "Peacock" Staffless Brake was the choice!

Full retails of this novel "Peacock" Brake installation are given in a feature story on page 557 of the September 24th issue of Electric Railway Journal.

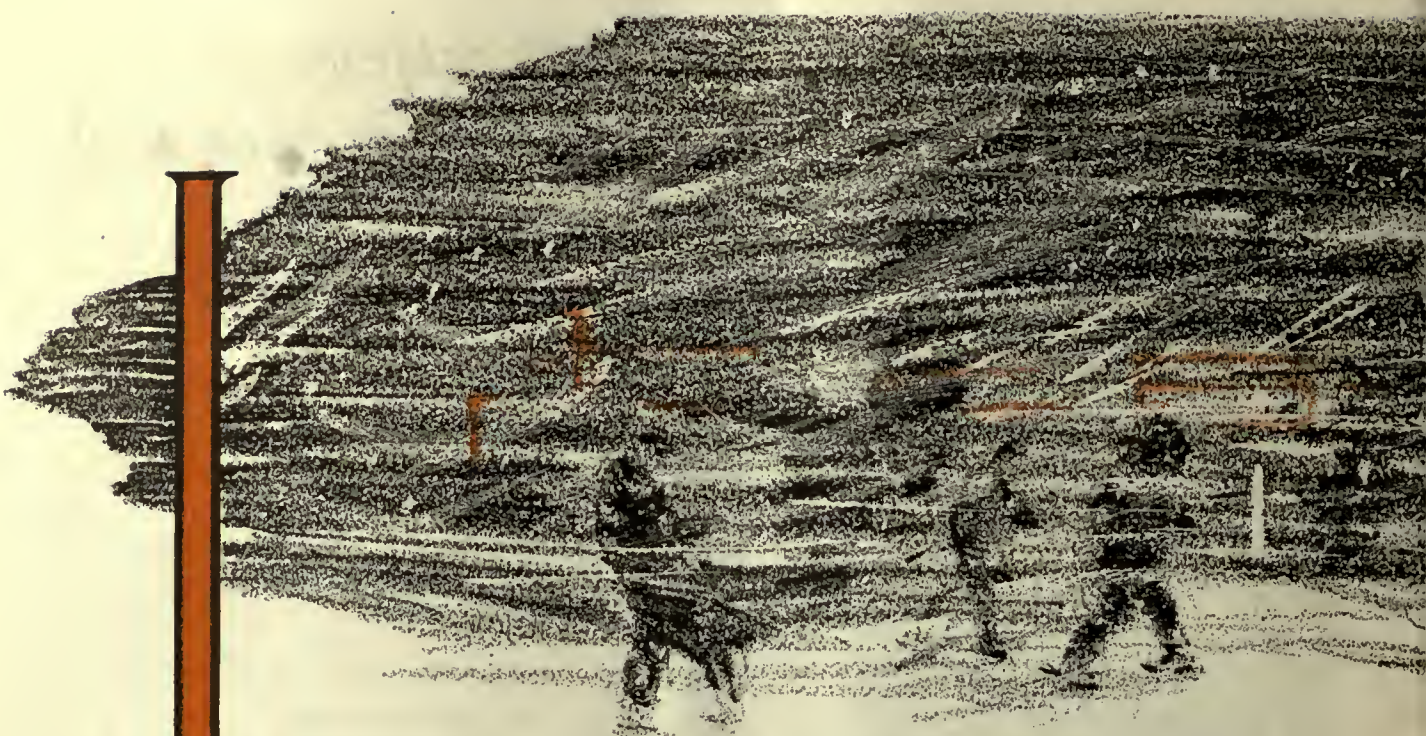
May we tell you of the many advantages gained through the use of "Peacock" Staffless Brakes?



National Brake Company, Inc.

890 Ellicott Square, Buffalo, N. Y.

Canadian Representotive
Lyman Tube & Supply Co., Ltd., Montreal, Can.



In ZERO weather.....

YELLOW COACH comfort

Chicago when the wind howls across Lake Michigan . . . . Times Square with the thermometer at zero . . . . Washington with ice on the Potomac . . . . wherever winter conditions are severe, there Yellow Coaches are found to represent the public preference.

Two years ago the Philadelphia Rapid Transit Company recognized the need for incorporating motor coaches into its great system. The selection of Yellows was based upon the recommendation of other existing installations. Two subsequent additions to the fleet bear witness to the complete satisfaction rendered to public and operator alike.



Sells public good will—

Similarly, throughout the seasons and in every clime, the public chooses Yellows for their comfort. The operator? The driver? They have their reasons as well! Dependability, simplicity of operation, unfailing maintenance of schedules . . . . all contribute to the need for a quality coach. But the public . . . . demands comfort! Yellow Coaches supply it.

YELLOW TRUCK & COACH MANUFACTURING CO.
SUBSIDIARY GENERAL MOTORS CORPORATION
5801 WEST DICKENS AVENUE, CHICAGO, ILL.

YELLOW COACH

A General Motors Product

"Kelly tires are giving us exceptionally good service."

THE BREWSILLON COMPANY
Canton, Ohio.

September 19, 1927.

* Mr. James Francis,
Canton, Ohio.

Dear Sir:-

Following is an extract from my last report, which may be of interest to you:

"Kelly-Springfield (34" x 7" H.P.) tires are giving us a little over 30,000 miles service, which is exceptionally good, considering abuse which they suffer on the mounded stone and clay road between Justus and Brewster. We feel that this section of road costs us at least 10,000 miles per tire as against what we could secure, on the average highway."

Yours truly,
THE BREWSILLON COMPANY
Per

WHILE every Kelly tire cannot reasonably be expected to give such long service as Mr. Hanlin has received from his, enough of them do last so long that such mileage long since ceased to be exceptional. Even when Kellys don't run anywhere near 30,000 miles it is usually found that the least they do is more than other tires under the same conditions are able to accomplish.

KELLY-SPRINGFIELD TIRE CO.
GENERAL MOTORS BLDG. NEW YORK, N.Y.

** Mr. Francis represents the Kelly-Springfield Tire Co. in the Canton territory.*



KELLY-SPRINGFIELD TIRES



International —*the Coach Ideal* for Owner — Rider — Driver

Everybody recognizes the vigorous need that has developed for a coach of *medium* capacity, of *tested* performance, providing the *maximum* in comfort, safety, and attractiveness, *moderate* in price, and serviced *"around the corner."*

International Harvester provides such a coach in the popular Model 15. This 6-cylinder International finds and keeps a host of friends wherever its route runs. It answers many calls, establishing profitable routes of shuttle-like frequency, serving railway stations and hotels, serving as feeder to car lines, as peak-load auxiliary to organized routes, serving the suburb, country club, and subdivision, taking the rising generation to the schools—or what have you? It is a money-maker and community builder in one.

The International Model 15 was especially designed and fully perfected for this inevitable market. It fits the natural coach needs of every community. It is bound to appeal to any man interested in passenger transportation. Furnished in three styles, the *street-car type* (shown above), the *Club Coach,* and the *Sedan Coach.* Equipped to carry 15 to 17 passengers — the ideal capacity. Write for the Model 15 Coach Catalog.

As for Service

to attend your coaches, there are 154 Harvester-owned branches all over the United States and Canada. In addition, International Trucks and Coaches have adequate representation in foreign countries throughout the world.

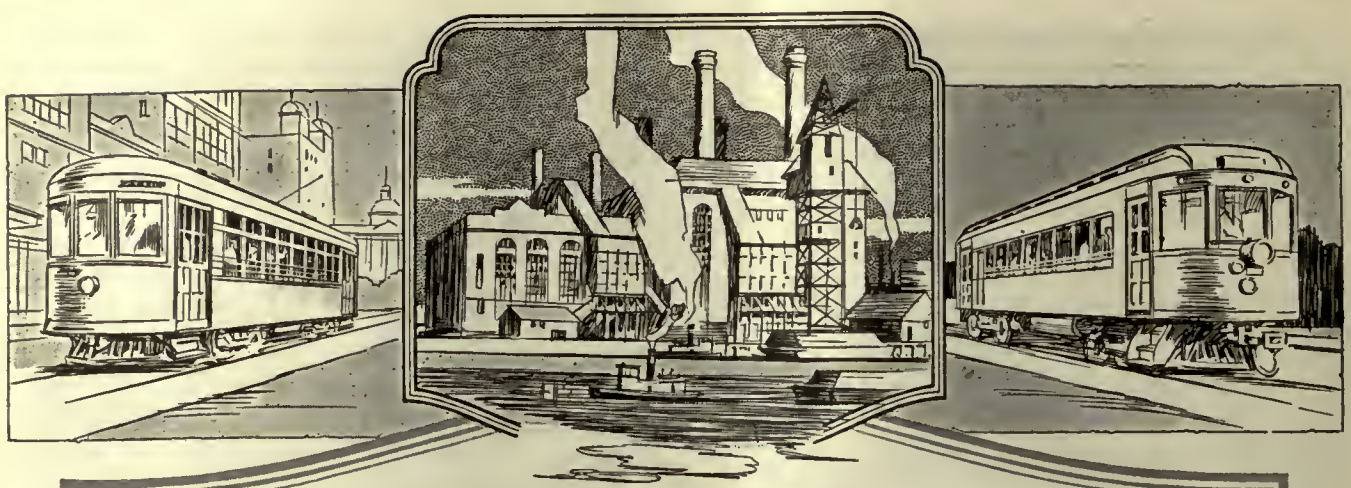
The International line also includes Speed Trucks and Heavy-Duty Trucks, and McCormick-Deering Industrial Tractors

INTERNATIONAL HARVESTER COMPANY
606 So. Michigan Ave. of America (*Incorporated*) Chicago, Ill.

INTERNATIONAL

SIX CYLINDER **COACHES** SIX CYLINDER

HARVESTER COMPANY





Electric Railway Lubrication
VETERANS

TEXACO proudly boasts of a staff of Electric Railway Engineers who thoroughly know the lubrication requirements for *every type* of rolling stock, track, power plant and sub-station in the Electric Railway Industry.

Every one of these men has had years of experience. During that time, each has been up against every one of the working conditions that come up on any road.

Thus, when a TEXACO Lubrication Engineer is called upon by a road to make recommendations, he will not talk generalities. He will, in cooperation with the principal in charge, offer *proofs* of ways and means to improve operation —here, by supplying a more efficient lubricant; there, by offering a more economical lubricant; and in another place by cutting down on the quantity of lubricant to be used.

With all his years of experience, the TEXACO Lubrication Engineer works with one thought uppermost:

To provide the most efficient lubrication for each and every unit—and the most economical according to a hard, dollars and cents basis.

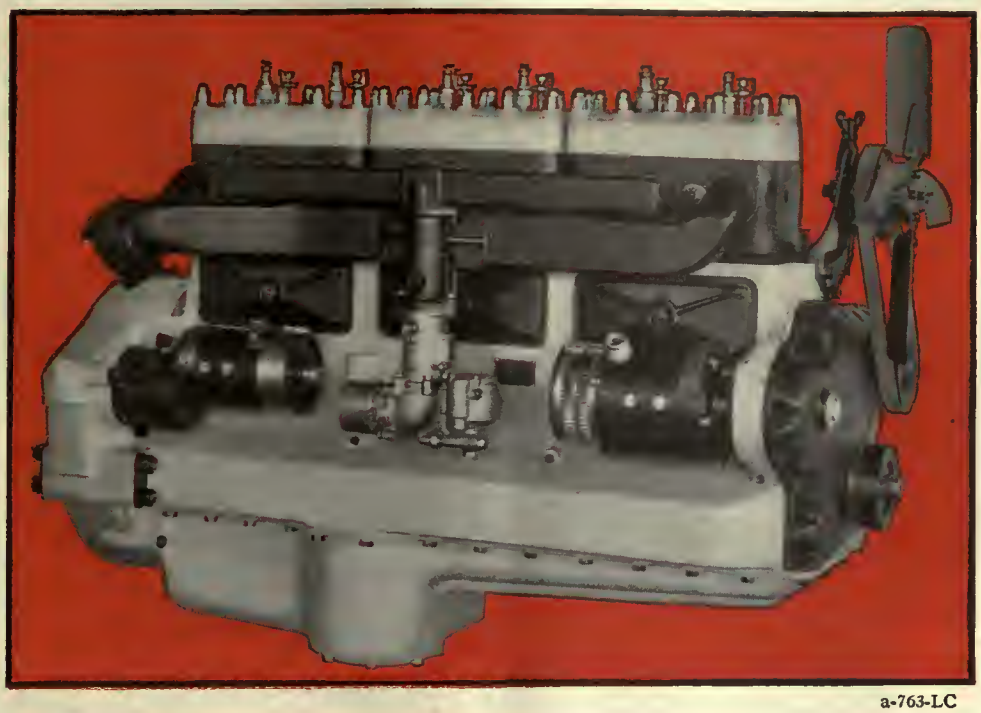
TEXACO Lubrication Engineers *have* shown the way to such economies by reducing maintenance costs on millions of car miles throughout the country.

Only a veteran Lubrication Engineer should be trusted to effect such economies—because only a Veteran can.

There is a TEXACO LUBRICANT *for every purpose.*

THE TEXAS COMPANY
Texaco Petroleum Products
17 BATTERY PLACE, NEW YORK CITY
Department EN2
OFFICES IN PRINCIPAL CITIES

Waukesha Heavy Duty Six designed for Bus and Truck Service



a-763-LC

Short Skirts vs. Long

Long skirts are grotesque—out of style of course and cumbersome too—but not more so than some of the bus engines used today. In the incredibly short time of three years, these 120 H. P. heavy duty Waukesha "Ricardo Head" bus engines have revolutionized bus and truck operators' ideas about design and performance. At the American Electric Railway Ass'n Convention in October two-thirds of the bus builders who purchase engines exhibited Waukesha equipped chasses. This is certain proof of what they thought of them after three years' trial.

Unusually long life and almost touring car mileage are the outstanding features of these engines. Longevity is due to the rigid combination of "girder" crankcase and a huge 3½-inch diameter crankshaft, also to an abundant supply of filtered oil which is pressure-fed to all bearings. Economy is due to the use of the genuine "Ricardo" head. Write for Bulletin 592 describing them.

A-785-LC

AUTOMOTIVE EQUIPMENT DIVISION

WAUKESHA MOTOR COMPANY

Waukesha Eight W. 40th Street **Wisconsin**

Eastern Sales Offices New York City

Exclusive Builders of Heavy Duty Automotive Type Engines for Over Twenty Years

Right on Schedule Time





It takes only a little fault to make a big break in bus schedules. Even such minor trouble as a broken battery post or a corroded terminal due to acid leakage, can cause an embarrassing delay -- in addition to putting the bus in red figures for the day's operation.

F. A. Willard

Soft rubber gaskets, fitting tight to battery posts, prevent creeping of battery acid, and guard against corrosion. And the gasket acts as a shock absorber, relieving cover and posts of much of the shock of traffic.

WILLARD STORAGE BATTERY COMPANY
CLEVELAND, OHIO

Willard Batteries

ROUND THE COUNTRY WITH TROLLEY WIRE

PHONO-ELECTRIC



AGAIN—the proof of 4-times wear from OAKLAND, CALIF.

Oakland made its first installation of Phono on June 24th, 1916. Just ten years and two months later this original 2/0 wire was replaced, with approximately 1,645,000 trolley passes to its credit, and having given approximately four times the life of hard-drawn copper at the same location. In addition the Key System Transit Company states that about 20% of its useful life still remained.

We cite this new proof of Phono's wearing qualities, not because it is unique, but because even now we are sometimes accused of exaggeration when we make our really conservative claim that Phono will consistently outwear hard-drawn copper *two to three times.*

The Phono Book tells in detail just why and how this exceptional wearability has been attained. Let us send you a copy.

"Bridgeport" BRASS TRADE CO. MARK

WE MAKE

Ledrite Brass Rod, *Phono-Electric* Contact Wire, *Plumrite* Brass Pipe, *Phono-Hi-Strength* Wire, Tubular Plumbing Goods, Condenser Tubes, Sugar Tubes, Brass, Bronze and Copper Sheets, Brass, Bronze and Copper Tubes, Auto, Bicycle and Pressure Pumps, Auto Accessories, Stampings, Engravers', Copper, Specialties, Screw Machine Products, Pressed or Drawn Products, Oil and Grease Guns.

BRIDGEPORT BRASS

PHONO-ELECTRIC PHONO HI-CON PHONO HI-STRENGTH

A COMPLETE WIRE SERVICE FOR ELECTRIC RAILWAYS

Bridgeport Brass Co., Bridgeport, Conn. - New York - Philadelphia - Chicago - Detroit - Cleveland



General's *Heavy Duty Cushion Tire* combines in one product the proved principles of all cushion tire building. No antiquated methods or machinery to cling to- nothing to stop General at any point short of the absolute limit of perfection



The

GENERAL

TIRE

—goes a long way to make friends

BUILT IN AKRON, OHIO, BY THE GENERAL TIRE AND RUBBER CO.



You'd never know that this was an old chassis



Before Lang Craftsmen took it, dismantled the old body and restored its revenue-building power by a modern body created and built by Lang, this old chassis was badly handicapped.

It was still perfectly good but it failed to draw the riding public as passengers. *The setting was lacking.* It had the power but not the "pull."

Note the result after being modernized in Lang's special department for body maintenance. *After all, it's the setting that counts!* Fine in line, luxurious in appointments, sturdy and practical in every detail, this new Lang Body puts the chassis back on the road where it can earn.

Look over *your* equipment. Lang Bodies will modernize many a chassis good for long life and mileage.

LANG BODIES



The Sterling Mark on Bus Bodie

"After all— it's the Setting that counts!"

AMPLE headroom is characteristic of bodies built by Lang. Passengers approach their seats without inconvenience. From the moment they enter until they leave, they are surrounded by every comfort and luxury.

To plan such bodies requires a skill that is highly specialized. To build them calls for a degree of workmanship that couples sturdy construction with finesse in detail.

THE LANG BODY COMPANY, CLEVELAND, OHIO





Worcester's 50 new cars equipped with H & K Seats

The 50 new cars for the Worcester (Mass.) Consolidated Railway are excellent examples of modern interiors fitted with Hale & Kilburn Seats.

These cars, built by the Osgood Bradley Car Company, are equipped with H & K No. 392-A Walkover Seats with deep springedge divided cushions and divided concave springedge backs.

Whatever your seat problem may be, you'll find the answer in Hale & Kilburn Equipment.

Ask for our latest catalog—and for a consultation with one of our representatives.

HALE & KILBURN COMPANY

General Offices and Works: 1800 Lehigh Avenue, Philadelphia

SALES OFFICES:

Hale & Kilburn Co., 30 Church St., New York
Hale & Kilburn Co., McCormick Bldg., Chicago
E. A. Thornwell, Candler Bldg., Atlanta
Frank F. Bodler, 903 Monadnock Bldg., San Francisco
Chris Eccles, 320 San Pedro St., Los Angeles
T. C. Coleman & Son, Starks Bldg., Louisville
W. L. Jefferies, Jr., Mutual Bldg., Richmond
W. D. Jenkins, Praetorian Bldg., Dallas, Texas
H. M. Euler, 146 N. Sixth St., Portland, Oregon

Hale and Kilburn SEATS

A Worth While Suggestion

to GENERAL MANAGERS, SUPERINTENDENTS OF EQUIPMENT, SUPERINTENDENTS OF ROLLING STOCK, GENERAL SUPERINTENDENTS, MECHANICAL ENGINEERS, MASTER MECHANICS

EACH ROAD has its distinctive organization set-up — but on each road some one of the above executives is deep in the throes of preparing his new car equipment and car rebuilding program for 1928.

If he will provide funds in his budget for equipping all new cars, and a goodly percentage of existing ones, with Hyatt Roller Bearing journal boxes—he will be pointing the way toward increased efficiency and economy of operation.

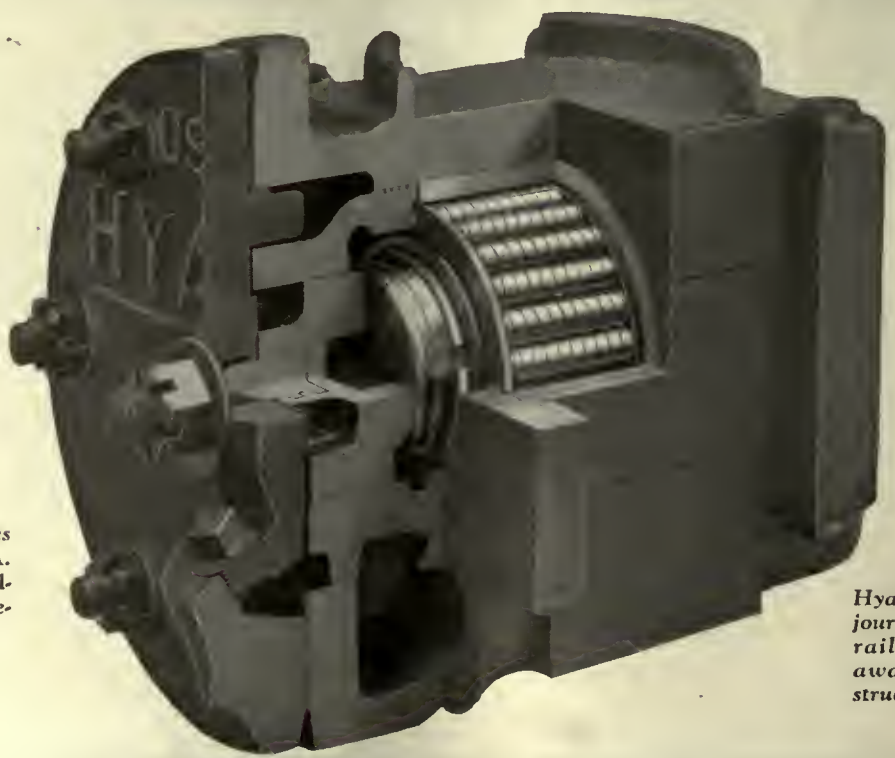
Hyatt equipped journal boxes indicate, through savings accomplished, a quick return of original investment, and not merely a nominal interest rate of earning. Practically no expense for oiling or inspection, the elimination of expensive brass journal box maintenance, power economy, quiet operation, etc., plus the satisfaction to passengers through greater comfort—make them a desirable and inexpensive addition to street cars.

The advantages and economies of Hyatt Roller Bearings are worth while investigating. Our engineering counsel is at your disposal.

HYATT ROLLER BEARING COMPANY

Newark Detroit Pittsburgh Chicago Oakland

Hyatt journal boxes meet every A. E. R. A. requirement for standard equipment or replacement.



Hyatt Roller Bearing journal box for street railway cars—cutaway to show construction.

HYATT

ROLLER BEARINGS

PRODUCT OF GENERAL MOTORS



De Laval
Oil Purifier

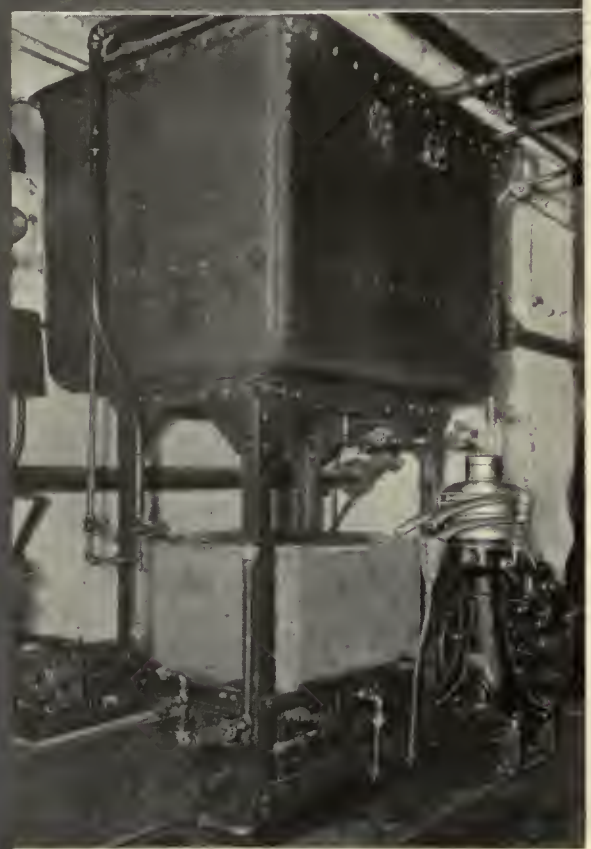
For three years the De Laval Oil Purifier shown in the illustration at the right has furnished clean oil to the bearings of all turbo-generators in the Cos Cob power plant of the New York, New Haven & Hartford Railroad Company.

In most cases, De Laval centrifugal purification enables oil to be maintained at the highest degree of purity at lower cost and with less trouble than is otherwise possible. Apparently Cos Cob is no exception to this rule for the chief engineer states that the Purifier "has given excellent service."

The oil purification system at Cos Cob station is arranged so that a portion of the oil in circulation can be by-passed and purified continuously, or the oil can be drained from any turbine reservoir and purified in a batch.

De Laval Purifiers are now used by more than 80% of America's largest producers of electrical energy. De Laval engineers will be glad to study your lubricating or insulating oil purification problems, giving you the benefit of the experience they have gained in working with these large companies. The coupon brings further information.

THE DE LAVAL SEPARATOR COMPANY
165 Broadway, New York 600 Jackson Blvd., Chicago
DE LAVAL PACIFIC COMPANY, San Francisco
ALFA-LAVAL CO., Ltd., 34 Grosvenor Road, London, S. W. 1.



Please send Bulletin containing further information regarding the De Laval Oil Purifier as checked below:

- ☐Purification of turbine lubricating oil.
- ☐Purification of Diesel lubricating oil and fuel oil.
- ☐Dehydration of transformer oil.

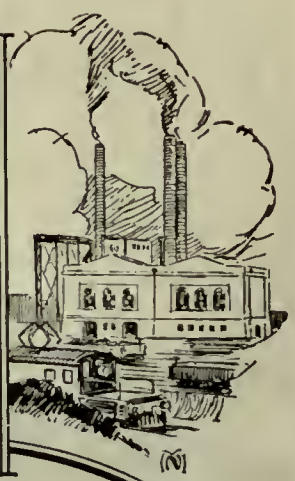
Name .....

Company .....

Address R.-662L



Are You using too much Oil?



Back in 1921 a large Wisconsin industry requested the services of our Lubrication Engineers.

Shortly after the request came in, an expert was on his way to make a survey of the plant and to recommend lubricants and methods of application that would result in decreased lubrication costs.

The survey lasted three months and brought about a substantial annual saving of lubricating oil.

The cost of lubricating this plant during December, 1921, shortly after the test was completed, was one-half less than the cost of lubricating the same machinery prior to the survey.

The correct application of the proper grades of

Standard Oils and Greases

in this plant resulted in a monthly saving which was even greater than was anticipated.

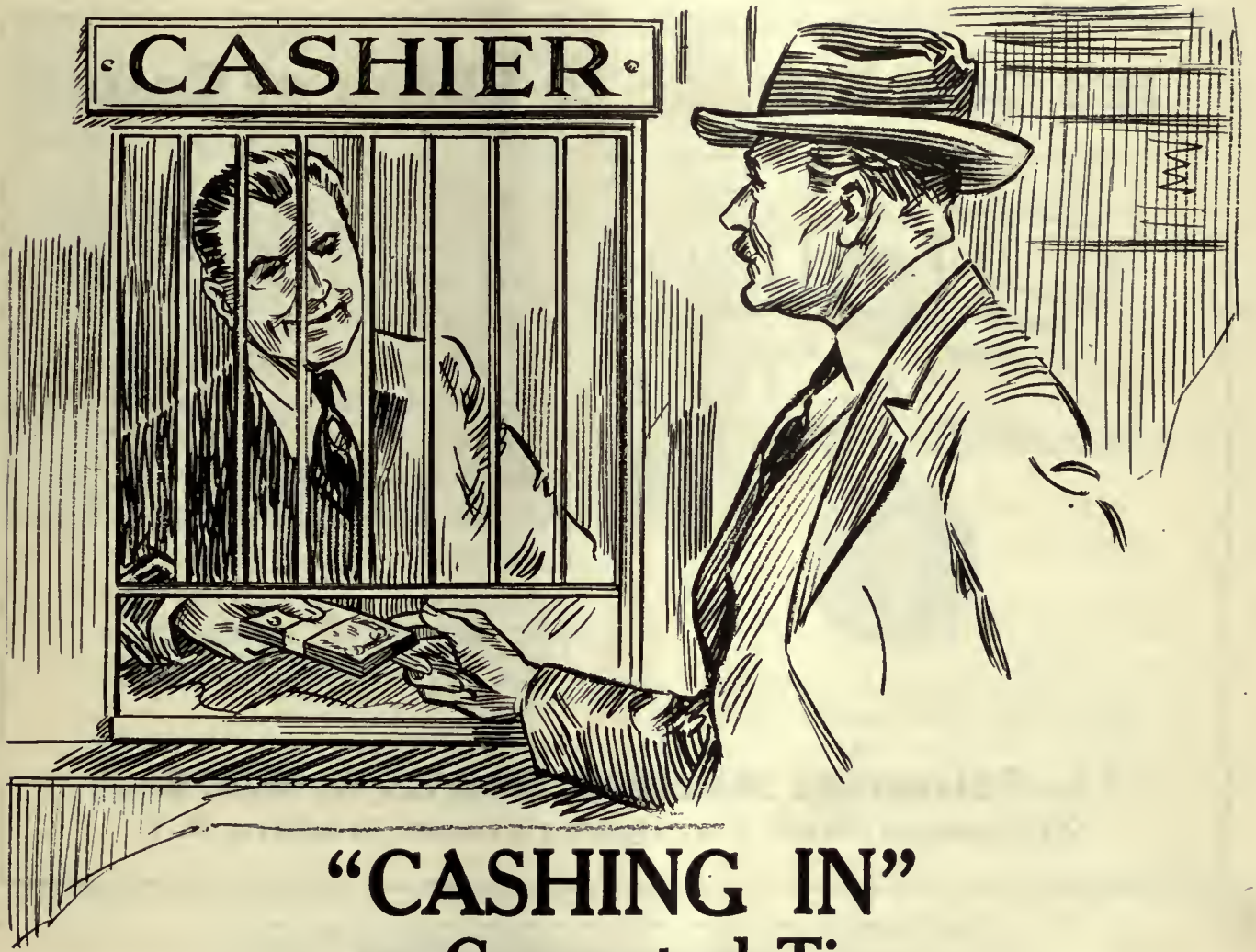
Perhaps our engineers can bring about the solution of one or more of your lubrication problems.

The services of our Lubrication Engineers are available to every industry in the middle-west. These men may be depended upon to locate and "seal the leaks" that decrease efficiency and increase lubrication costs.

To avail yourself of this service costs you nothing, nor does it obligate you in any way. Just phone or write our nearest branch office.

STANDARD OIL COMPANY
(Indiana)
910 South Michigan Avenue Chicago, Illinois





"CASHING IN"
on Creosoted Ties

YOU are always sure to "cash in" on creosoted ties. Just as certain as cashing the coupons on gilt edge investment issues. There is no element of uncertainty as to their long life, durability and fitness for electric traction service. The additional cost for creosoting pays for itself many times over. Creosoted ties have been time tested and they have demonstrated economical service in both open and closed track. Under heavy steam railway traffic they are rendering over twenty years of service. Some roads have cut their tie renewals in half. ***International*** has ties in service on the New Orleans-Carrolton Street Railway for over 25 years and their condition indicates they are good for many more years. During a street improvement program in New Orleans, creosoted ties which were in service 14 years were torn up. Their condition was so good that the ties were used again in the new track construction.

A recent investigation shows that 24 prominent electric railways, long users of creosoted ties, report large tie savings, and that treated ties proved economical and satisfactory in every detail.

International Ties are manufactured from sound timber—hewed to full size—properly seasoned and treated. Strong ties which will stand up in service are thus assured.

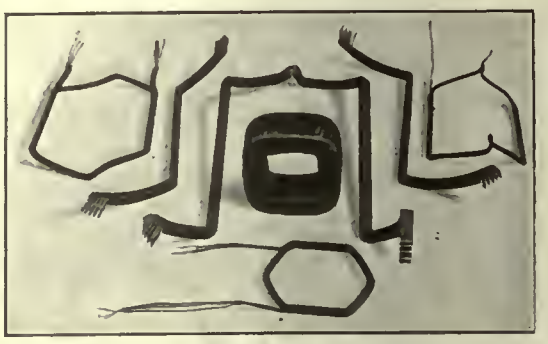
International Creosoting and Construction Co.

General Office—Galveston, Texas

Plants: Texarkana—Beaumont—Galveston

International
HIGH GRADE CREOSOTED TIES

It's Cold Enough to Think of Coils



COLD weather once more brings the thought of winter "shorting" with the need for a replenished stock of coils. And Columbia is once more ready to supply all of the armature and field coils needed to pull through the hardest winter you could be called upon to face. Quality? *Of course*, we'd be glad to take you through our works and show you every detail of the making. Price? That's another thing we're proud of. Ask us, at any time, to quote you on your coil requirements.

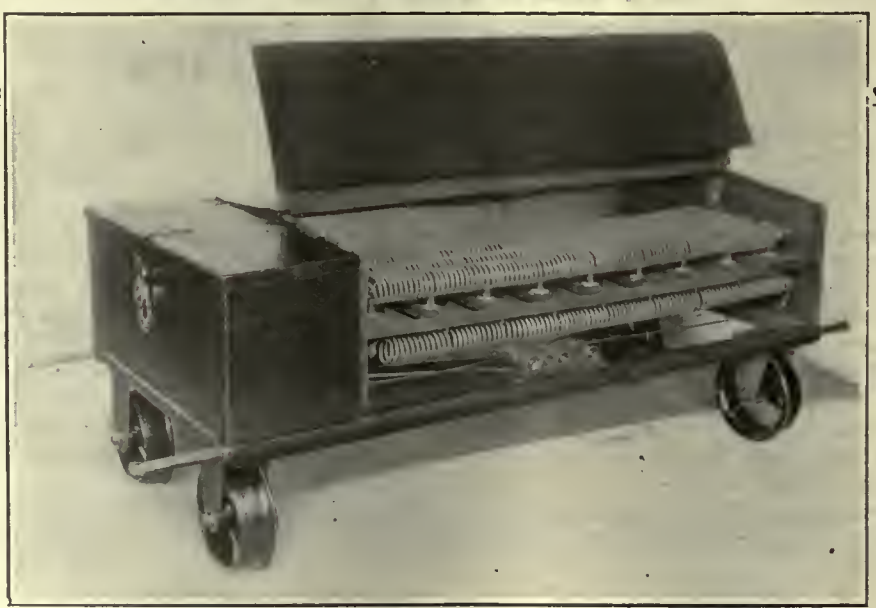
COLUMBIA 1892 MACHINE WORKS

Railway Supplies and Equipment

Machine and Sheet Metal Work, Machinery, Grey Iron and Brass Castings, Patterns, Forgings, Armature and Field Coils.

The Columbia Machine Works & M. I. Co.

263 Chestnut Street, Cor. Atlantic Avenue, Brooklyn, N. Y.



EASIER BONDING

New SBR

The type SBR rheostat is a complete brazed bonding outfit in a single portable unit. Space opposite the resistance and a tool box provide convenient storage for welding furnace, trolley poles, bonds, supplies. Frame made of strong, light-weight *steel* tubing. Carrying handles slide in out of the way when not in use.

The coiled ¼-in. diameter resistance wire is supported horizontally. Insulation is pure mica. Current steps of 140, 165, 200 and 240 amperes provide proper regulation for low voltage and full voltage lines. There's nothing like SBR.

For particulars and prices, write

The Electric Railway Improvement Company

2070 EAST 61st PLACE CLEVELAND, OHIO



Interior View of One of Bethlehem Track Layout Buildings.

Track Specialties *for* Electric Railways

Laying out and fitting up of special trackwork in an especially equipped shop before shipment is assurance that the trackwork will assemble accurately on the job. All materials used are manufactured in Bethlehem Plants to the high standard of Bethlehem quality and workmanship.

Catalog or descriptive literature sent on request

A condensed list of Track Specialties

Tee and Girder Rails; Bethco Rail Anchors; Machine Fitted Joints; Splice Bars; Hard Center Frogs; Hard Center Mates; Rolled Steel Alloy Steel Crossings; Guard Rails; Abbot and Center Rib Base Plates; Rolled Steel Wheels and Forged Axles; Tie Rods; Bolts; Tie Plates; Pole Line Material; Mine Ties; Light Rails; Switches; Switch Stands; Grimm Rail Clamps and Industrial Track Specialties.

BETHLEHEM STEEL COMPANY, *General Offices:* BETHLEHEM, PA.

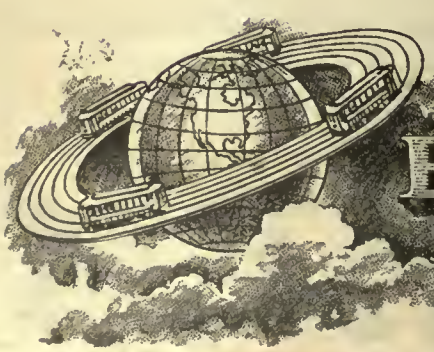
District Offices:

New York Boston Philadelphia Baltimore Washington Atlanta Pittsburgh Buffalo
Cleveland Detroit Cincinnati Chicago St. Louis San Francisco Seattle Los Angeles Portland

Bethlehem Steel Export Corporation, 25 Broadway, New York City, Sole Exporter of Our Commercial Products

BETHLEHEM

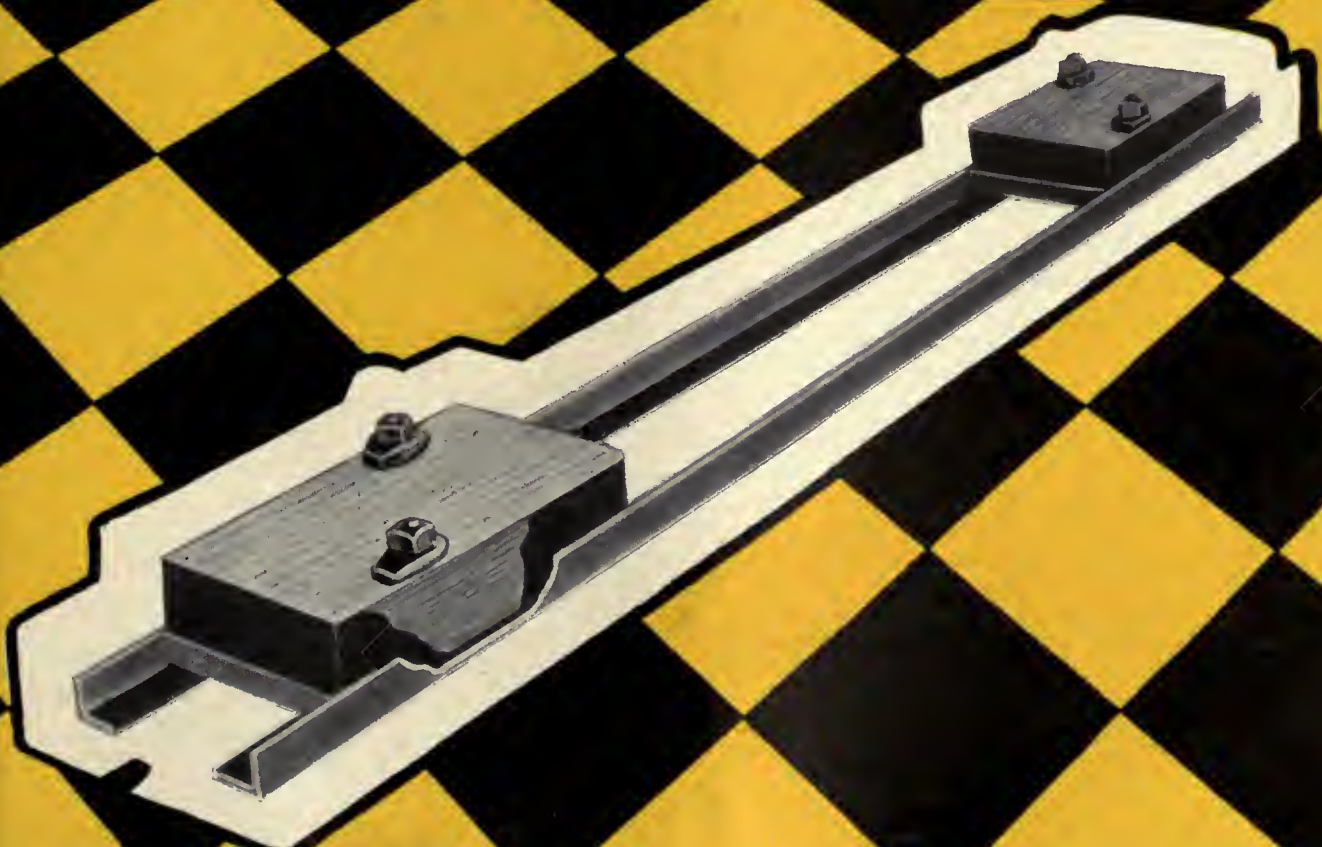
JUST as the electric railway companies have to compile and be guided by exhaustive statistics as to peak loads, traffic densities, costs per mile, and so forth, we must constantly keep ourselves informed as to purchasing power, density of population and all vital market information in order to maintain our service as an active asset of your service.



Barron G. Collier
INCORPORATED
CANDLER BLDG. NEW YORK

The Appeal of Quietness

DAYTON MECHANICAL TIE CO.
DAYTON, OHIO



The Appeal of Quietness

Quietness was among the vital developments in railway cars, as seen at the A.E.R.A. convention.

But quietness is not all a matter of cars. After you have eliminated grinding gears, and creaking frames, the track is still to be considered. If track roars and bumps, the quietness of the cars is only half the job.

Dayton Ties help eliminate noise in two ways.

First — track laid on Dayton Ties stays smooth — five — ten — fifteen — sixteen — we don't know how many years since the inception of Dayton Ties 16 years ago no track laid on them has failed.

Second — the feature of Dayton Ties which absorbs destructive vibration — the vibration that would otherwise destroy concrete — also absorbs sound. Vibration and sound are closely allied.

Silent cars operated over Dayton Tracks give you the acme of quiet operation.

Dayton Tie Track is always Smooth

THE DAYTON
MECHANICAL TIE CO.
DAYTON, OHIO



70%



10%

—of all the cars shown on the exhibit tracks at Cleveland were equipped with either wheels or tires manufactured by

STANDARD STEEL WORKS COMPANY

PHILADELPHIA, PA.

BRANCH OFFICES:

CHICAGO
ST. LOUIS
NEW YORK
HOUSTON
PORTLAND

RICHMOND
MEXICO CITY
SAN FRANCISCO
ST. PAUL
PITTSBURGH

WORKS: BURNHAM, PA.



TRUCK WITH TOWER IN RUNNING POSITION

TRENTON TOWER

This 3-Section

is not only more convenient, but stronger than the older type.

The top section is reinforced by the intermediate section. The 3-section design makes it possible to raise the platform 16 inches higher and drop it 12 inches lower than can be done with the old-style 2-section tower.

We'll gladly send you details.

J. R. McCARDELL CO.
Trenton, New Jersey, U. S. A.

Griffin Wheel Company

410 North Michigan Ave.
Chicago, Ill.

Griffin Wheels

with
Chilled Rims
and
Chilled Back of Flanges
For Street and Interurban Railways

FOUNDRIES:

Chicago	Boston	St. Paul
Detroit	Kansas City	Los Angeles
Denver	Council Bluffs	Tacoma
Cleveland	Salt Lake City	Cincinnati

Why Le Carbone Carbon Brushes?



Reason No. 14

Whether in the power house or on a car, the failure of a carbon brush can easily tie up the line. "Le Carbone" Carbon Brushes do not fail.

They talk for themselves

W. J. Jeandron
Factory Terminal Bldg.
Fifteenth Street, Hoboken, N. J.
Pittsburgh Office: 634 Wabash Bldg.
Chicago Office: 1657 Moondnock Block
San Francisco Office: 525 Market Street
Canadian Distributors: Lyman Tube & Supply Co., Ltd.
Montreal and Toronto



MORE-JONES TROLLEY WHEELS AND HARPS

WE MANUFACTURE various types of trolley equipment. The quality of metal, conductivity, resistance to friction, effect on overhead, shape and size of wheel groove, have all been carefully worked out and perfected. In addition to the highly specialized V-K Oilless Trolley Wheels and Harps, More-Jones make the most complete line of lubricated trolley wheels and harps to meet all requirements. Let us quote you.

National Bearing Metals Corporation
St. Louis, Mo.

"MORE-JONES QUALITY PRODUCTS"

Shuler Front Axles



For: TRUCKS, MOTOR BUSSES, TAXIS

And a Complete Line for

TRACTORS and TRAILERS

THE QUIET VOICE OF QUALITY

A Good Front Axle is a modest thing. It never pushes itself into the limelight.

FRONT AXLES ONLY

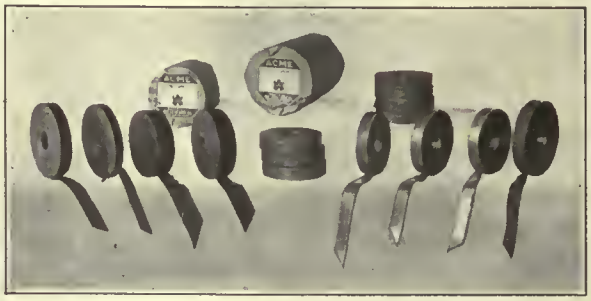
—

Shuler Axle Co.

Incorporated

Louisville, Ky.

Member of Motor Truck Industries, Inc., of America



Like Chickens Come Home To Roost!

To repair is to *restore*. It pays to wind the best tape into a job that you can get. That makes the job as good as new.

Poor tape is tricky and deceitful. It may not go bad for some time, but when it does, then the blame comes home to roost on the furrowed brow of the man who took a chance!

For Safety, Use Acme

Varnished Tapes

Electrically and Physically Tested for

DIELECTRIC STRENGTH
DIELECTRIC CONSTANT
DIELECTRIC LOSS
INSULATION RESISTANCE
POWER FACTOR
FLEXIBILITY
RESISTANCE TO TEAR
TENSILE STRENGTH
RESISTANCE TO OILS, ACIDS AND GASES
RESISTANCE TO IMPREGNATING COMPOUNDS

Acme Varnished Tapes are furnished in widths of ¼ inch and wider, and in rolls of continuous length without splices. Special widths and finishes supplied on order. Write for catalog 3-J for your files.

THE ACME WIRE CO.

Main Office and Plant, New Haven, Conn.

Branches

New York, 52 Vanderbilt Ave. Chicago, 427 West Erie Street
Cleveland, Guardian Bldg.



Complete satisfaction

Operating perfectly and requiring minimum attention for maintenance and lubrication, Earll Catchers and Retrievers give genuinely satisfactory results. Their refinement of design, and mechanical superiority are summarized in the following five features, peculiar to Earll construction.

No-wear Check Pawl
Free-Winding Tension Spring
Ratchet Wind
Emergency Release
Perfect Automatic Lubrication

Earll Catchers and Retrievers

C. I. EARLL, York, Pa.

Canadian Agents:
Railway & Power Engineering Corp., Ltd., Toronto, Ont.
In All Other Foreign Countries:
International General Electric Co., Schenectady, N. Y.



JOHNSON FARE COLLECTING SYSTEMS

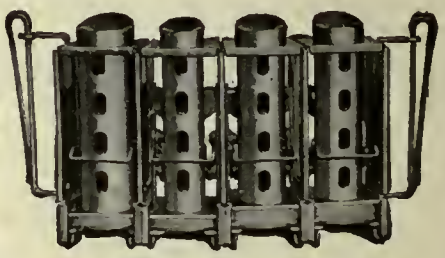


Johnson Electric Fare Boxes and overhead registers make possible the instantaneous registering and counting of every fare. Revenues are increased 1½ to 5% and the efficiency of one-man operation is materially increased. Over 4000 already in use.

When more than two coins are used as fare, the Type D Johnson Fare Box is the best manually operated registration system. Over 50,000 in use.

Johnson Change-Makers are designed to function with odd fare and metal tickets selling at fractional rates It is possible to use each barrel separately or in groups to meet local conditions. Each barrel can be adjusted to eject from one to five coins or one to six tickets.





Johnson Fare Box Co.
4619 Ravenswood Ave., Chicago, Ill.



Drip Points for Added Efficiency

They prevent creeping moisture and quickly drain the petticoat in wet weather, keeping the inner area dry.

The Above Insulator—No. 72—Voltages—Test—Dry 64,000 Wet 31,400, Line 10,000.

Our engineers are always ready to help you on your glass insulator problem. Write for catalog.

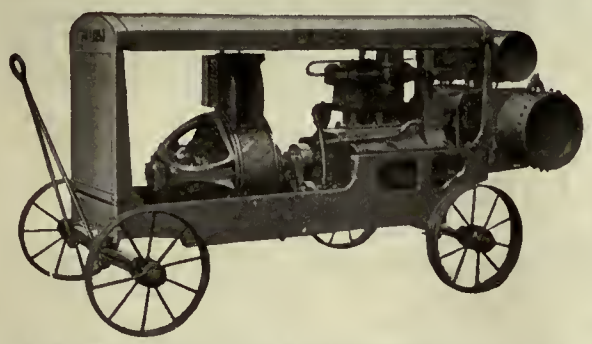
Hemingray Glass Company
Muncie, Ind.
Est. 1848—Inc. 1870

Used and Surplus Equipment

INDIVIDUAL items of used equipment, or surplus new equipment, or complete plants, are disposed of (and found) through advertising in the *Searchlight* Section of this paper.

This is the section which so effectively aided the Government in selling the many millions of dollars worth of surplus material and equipment accumulated during the war without disturbing the market.

"SEARCHLIGHT"



Electric Motor Driven Sullivan 103-ft. Portable Compressor on steel wheels. Catalog 3283-E



"DW-221" Heavy Concrete Breaker Catalog 3281-I

Speed Up With Air

The Sullivan electric portable, Class "WK-322" compressor is built especially to speed up your construction and repair work out on the tracks. It takes power from the nearest feed wire and is good for 100 lbs. pressure. Capacities of 103 and 206 cu. ft. are available; and mountings are steel wheels, rubber-tired trailer trucks, skids, or your own truck or work car.



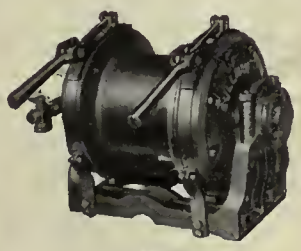
"DP-331" Hollow Piston Rotator Catalog 3281-F

Sullivan "Busters", run by the Sullivan Compressor, will cut your concrete and asphalt quickly; while Sullivan Spaders will dig clay for you at half the cost of pick and shovel labor.

Where rock is to be drilled, use Sullivan Rotator Rock Drills. In erecting poles, hoisting materials, or pulling cars you will find the little 345-lb. Sullivan Turbinair hoist valuable. It will lift a ton or pull a 50-ton car.



Sullivan Spader, Catalog 3281-J



Turbinair Hoist Catalog 3276-F

Write today for Pictorial Booklet "Speed Up With Air"

SULLIVAN TRADE MARK MACHINERY COMPANY
132 S. Michigan Ave. Chicago

Join the Leaders



STREET Railways are on the threshold of a new era. New track, new drives, all types of new equipment are in evidence.

Already far seeing companies in many hundred cities and towns have installed Elreco Tubular Steel Poles. For—

Elreco stands for finest appearance, greatest adaptability, lightest weight, lowest installation and maintenance cost. Trolley wires, lighting wires and lighting units are all carried by one pole.

It is no longer necessary for individual companies to use separate poles. When three or four companies use one Elreco Steel Pole the cost to each, of installation and maintenance, is greatly reduced.

Investigate. Thirty-five years experience enables us to meet any requirement. Address—

The Electric Railway Equipment Company

2900 Cormany Ave., Cincinnati, O. or
30 Church St., N. Y.

Bankers and Engineers

Ford, Bacon & Davis
Incorporated
Engineers
115 Broadway, New York
PHILADELPHIA CHICAGO SAN FRANCISCO

The J. G. White Engineering Corporation
Engineers—Constructors
Oil Refineries and Pipe Lines, Steam and Water Power Plants, Transmission Systems, Hotels, Apartments, Office and Industrial Buildings, Railroads.
43 Exchange Place New York

STONE & WEBSTER
Incorporated
Design and Construction
Examinations Reports Appraisals
Industrial and Public Service Properties
NEW YORK BOSTON CHICAGO

THE BEELER ORGANIZATION
Transportation, Traffic, Operating Surveys
Better Service—Financial Reports
Appraisals—Management
52 Vanderbilt Ave. New York

SANDERSON & PORTER
ENGINEERS
PUBLIC UTILITIES & INDUSTRIALS
Design Construction Management
Examinations Reports Valuations
CHICAGO NEW YORK SAN FRANCISCO

ENGELHARDT W. HOLST
Consulting Engineers
Appraisals Reports Rates Service Investigation
Studies on Financial and Physical Rehabilitation
Reorganization Operation Management
683 Atlantic Ave., BOSTON, MASS.

ALBERT S. RICHEY
ELECTRIC RAILWAY ENGINEER
WORCESTER, MASSACHUSETTS
REPORTS - APPRAISALS - RATES - OPERATION - SERVICE

WALTER JACKSON
Consultant on Fares and Motor Buses
The Weekly and Sunday Pass—Differential Fares—Ride Selling
Holbrook Hall 5-W-3
160 Gramatan Ave., Mt. Vernon, N. Y.

A. L. DRUM & COMPANY
Consulting and Constructing Engineers
VALUATION AND FINANCIAL REPORTS
RATE STUDIES FOR PRESENTATION TO PUBLIC SERVICE COMMISSIONS
CONSTRUCTION AND MANAGEMENT OF ELECTRIC RAILWAYS
230 South Clark Street, Chicago, Ill.

DAY & ZIMMERMANN, INC.
ENGINEERS
DESIGN - CONSTRUCTION - REPORTS
VALUATIONS - MANAGEMENT
NEW YORK PHILADELPHIA CHICAGO

STEVENS & WOOD
INCORPORATED
ENGINEERS AND CONSTRUCTORS
120 BROADWAY, NEW YORK
ENGINEERING CONSTRUCTION YOUNGSTOWN, O. FINANCING MANAGEMENT

HEMPHILL & WELLS
CONSULTING ENGINEERS
Gardner F. Wells Albert W. Hemphill
APPRAISALS
INVESTIGATIONS COVERING
Reorganization Management Operation Construction
43 Cedar Street, New York City

LINN & MARSHALL, *Inc.*
Financing — Engineering — Management
PUBLIC UTILITIES
ELECTRIC RAILWAYS — MOTOR BUSES —
GAS — ELECTRIC
25 Broadway, New York City

C. B. BUCHANAN, President — W. H. PRICE, JR., Sec'y-Treas. — JOHN F. LAYNG, Vice-President
BUCHANAN & LAYNG CORPORATION
Engineering and Management, Construction
Financial Reports, Traffic Surveys
and Equipment Maintenance
BALTIMORE 1004 Citizens National Bank Bldg. Phone: Hanover: 2142 NEW YORK 49 Wall Street

E. H. FAILE & CO.
Designers of
Garages— Service Buildings—Terminals
441 LEXINGTON AVE. NEW YORK

McCLELLAN & JUNKERSFELD
Incorporated
ENGINEERING AND CONSTRUCTION
Examinations—Reports—Valuations
Transportation Problems—Power Developments
68 Trinity Place, New York
Chicago St. Louis

THE BABCOCK & WILCOX COMPANY

85 LIBERTY STREET, NEW YORK

Builders since 1868 of Water Tube Boilers of continuing reliability

BRANCH OFFICES

BOSTON, 80 Federal Street
PHILADELPHIA, Packard Building
PITTSBURGH, Farmers Deposit Bank Building
CLEVELAND, Guardian Building
CHICAGO, Marquette Building
CINCINNATI, Traction Building
ATLANTA, Candler Building
PHOENIX, ARIZ., Heard Building
DALLAS, TEX., Magnolia Building
HONOLULU, H. T., Castle & Cooke Building
PORTLAND, ORE., Gasco Building

WORKS
Bayonne, N. J.
Barberton, Ohio

Makers of Steam Superheaters since 1898 and of Chain Grate Stokers since 1893

BRANCH OFFICES

DETROIT, Ford Building
NEW ORLEANS, 344 Camp Street
HOUSTON, TEXAS, Electric Building
DENVER, 444 Seventeenth Street
SALT LAKE CITY, Kearns Building
SAN FRANCISCO, Sheldon Building
LOS ANGELES, Central Building
SEATTLE, L. C. Smith Building
HAVANA, CUBA, Calle de Aguiar 104
SAN JUAN, Porto Rico, Royal Bank Building

J. ROWLAND BIBBINS

Engineer—2301 Connecticut Ave., N.W., Washington, D. C.

TRANSPORTATION SURVEYS
Organized Traffic Relief and Transit Development
Co-ordinating Motor Transport, Railroad and City Plans, Service, Routing, Valuation, Economic Studies
EXPERIENCE IN 20 CITIES

KELKER, DeLEUW & CO.

CONSULTING ENGINEERS
REPORTS ON
Operating Problems Valuations Traffic Surveys
111 W. Washington Street, Chicago, Ill.

THE P. EDWARD WISH SERVICE

50 Church St. NEW YORK — *Street Railway Inspection* DETECTIVES — 131 State St. BOSTON

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.



TULC
A LUBRICANT

We make a specialty of
ELECTRIC RAILWAY LUBRICATION
We solicit a test of TULC on your equipment
The Universal Lubricating Co.
Cleveland, Ohio
Chicago Representatives: Jameson-Ross Company, Straus Bldg.

PRETTYMAN PRESERVED P27 FOREST PRODUCTS

CREOSOTED

Railroad Cross-ties; Switch-ties; Bridge Timbers; Construction Timbers; Mine Timbers; Lumber; Piling; Poles; Posts and other Forest Products

J. F. Prettyman & Sons
Wood Preserving Plant
Charleston, S. C.

UNA

RAIL JOINTS
DYNAMOTORS
WELDING ROD
UNA Welding & Bonding Co.
Cleveland, Ohio.



Gets Every Fare
PEREY TURNSTILES or PASSIMETERS
Use them in your Prepayment Areas and Street Cars
Perey Manufacturing Co., Inc.
101 Park Avenue, New York City

"Bates Poles Outlive the Bond Issues that Buy Them"
BATES POLES AND STRUCTURES
Bates Expanded Steel Truss Co.
General Offices and Plants
EAST CHICAGO, INDIANA, U. S. A.

THE WORLD'S STANDARD
"IRVINGTON"

Black Varnished Silk, and Yellow Varnished Cambric, Varnished Paper
Irv-O-Slot Insulation Flexible Varnished Tubing
Insulating Varnishes and Compounds

Irvington Varnish & Insulator Co.
Irvington, N. J.

Sales Representatives:

Mitchell-Rand Mfg. Co., N. Y.
E. M. Wolcott, Rochester
I. W. Levine, Montreal
A. L. Gillies, Toronto
Prehler Brothers Inc., Chicago
White Supply Co., St. Louis
Clapp & LaMoree, Los Angeles
Martin Woodard, Seattle
Consumers' Rubber Co., Cleveland

TAYLOR ELECTRIC TRUCK CO.

TROY, N. Y.

Manufacturers of

ELECTRIC RAILWAY CAR TRUCKS for MODERN EQUIPMENT

Journal Bearings, Journal Boxes, Pedestals, Brake Heads
Brake Shoes, Brake Chains, Center Bearings, Etc.

ELLIPTIC and COIL SPRINGS for ANY TYPE or MAKE of CAR TRUCK

Springs for Automobile Trucks and Buses

QUALITY at LOW COST. WRITE US.

Lorain Special Trackwork Girder Rails

Electrically Welded Joints

THE LORAIN STEEL COMPANY

Johnstown, Pa.

Sales Offices:

Atlanta Chicago Cleveland New York
Philadelphia Pittsburgh Dallas

Pacific Coast Representative:
United States Steel Products Company
Los Angeles Portland San Francisco Seattle

Export Representative:
United States Steel Products Company, New York, N. Y.

TISCO MANGANESE STEEL SPECIAL TRACKWORK

Wharton *Tisco* Manganese Steel Trackwork will help you hold the up-keep down.

WM. WHARTON JR. & CO., INC.
Easton, Penna.

B. A. HEGEMAN, Jr., President H. A. HEGEMAN, First Vice-Pres. and Treas.
F. T. SARGENT, Secretary W. C. PETERS, Vice-Pres. Sales and Engineering

National Railway Appliance Co.

Graybar Building, 420 Lexington Ave., New York

BRANCH OFFICES

Munsey Bldg., Washington, D. C. 100 Boylston St., Boston, Mass.
Hegeman-Castle Corporation, Railway Exchange Building, Chicago, Ill.

RAILWAY SUPPLIES

Tool Steel Gears and Pinions
Anglo-American Varnish Co., Varnishes, Enamels, etc.
National Hand Holds
Genesco Paint Oils
Dunham Hopper Door Device
Garland Ventilators
Walter Tractor Snow Plows
Feasible Drop Brake Staffe
Ft. Pitt Spring & Mfg. Co., Springs
Flaxlinum Insulation
Economy Electric Devices Co.
Power Saving and Inspection Meters
National Safety Devices Company's Whistle Blowers, Gong Ringers and Brake Hangers
Godward Gas Generators
Cowdry Automotive Brake Testing Machine

The DIFFERENTIAL CAR



Standard on 60 Railways for

Track Maintenance
Track Construction
Ash Disposal
Coal Hauling
Concrete Materials
Waste Handling
Excavated Materials
Hauling Cross Ties
Snow Disposal

Use These Labor Savers

Differential Crane Car
Clark Concrete Breaker
Differential 3-way Auto Truck Body
Differential Car Wheel Truck and Tractor

THE DIFFERENTIAL STEEL CAR CO., Findlay, O.

They Slip Into Grooves Without Hammering

Thirty-seven years building the best in coils has taught us how to make coils that slip into grooves without excessive hammering—for hammering shortens coil life.

No coil outlives an Elliott-Thompson. For particulars address—

The Elliott-Thompson Electric Co.
Ajax Building, Cleveland, Ohio





STEEL CROSS TIES

insure a permanent, repair-free track. Temperature variations, water or decay will not affect it. ¶ Steel Cross Ties are now being used in practically all new work where economy and permanency are the chief considerations. ¶ If you are interested in "low-maintenance-cost" track, send for a copy of our booklet—Steel Cross Ties.

CARNEGIE STEEL COMPANY

General Offices · Carnegie Building · 434 Fifth Avenue

PITTSBURGH PENNSYLVANIA



Strombos Signals for Railway Service

A pleasing sound of tremendous volume is emitted from the powerful Strombos Signal which is admirably suited for railway service. Day in, day out, it broadcasts a warning of approaching danger and promotes safe and efficient railway operation.

The Strombos Signal operates on an air pressure of 10 lbs. and over and is controlled by a lever valve and cord. It uses only 1/10 the volume of air required by a whistle. It has no moving parts which might fail in the emergency.

Write us for more complete data.

AMERICAN STROMBOS CO.

INCORPORATED

18th & Market Sts., Philadelphia, Pa.

ELECTRICAL INSULATION

PERFECT MICANITE INSULATOR and PERFECT EMPIRE INSULATOR

Micanite and Super-Micanite Sheets, Commutator Segments, and Commutator Rings.

Micanite Tubes and Washers

Linotape, Seamless or Sewn Bias (*Yellow or Black Varnished Tapes*)

Empire Oiled Cloths and Papers (*Yellow or Black*)

Compounds, Varnishes, Etc.

Send for catalog and helpful booklet on Commutator Insulation and Assembly

MICA INSULATOR COMPANY

Largest manufacturers in the world of mica insulation.

Established 1893.

New York: 68 Church St. Chicago: 542 So. Dearborn St.

Cleveland Pittsburgh Cincinnati
San Francisco Los Angeles Seattle

Works: Schenectady, New York. Victoriaville, Canada; London, England



SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.

Positions Vacant and all other classifications, 8 cents a word, minimum charge $2.00.

Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.

Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

1 to 3 inches.....$4.50 an inch
4 to 7 inches..... 4.30 an inch
8 to 14 inches..... 4.10 an inch

Rates for larger spaces, or yearly rates, on request.

An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

POSITION VACANT

CLAIM adjuster and investigator; one experienced in the preparation of cases for court trial as well as a good settler. To such a man, an opportunity to join the staff of one of the large railway and power companies in a city of more than half a million population is offered State age, years of experience. P-62, Electric Railway Journal, Guardian Bldg., Cleveland, Ohio.

MANAGER: for prompt engagement with combined electric railway and motor bus operation in east central state, having fifty miles of operation; must be trained technician, with experience in dealing with public relationships and labor; reply with full particulars covering training, experience and references. P-58, Electric Railway Journal, 1600 Arch St., Phila., Pa.

POSITIONS WANTED

EQUIPMENT supervisor, thoroughly experienced and successful in maintenance of city, interurban cars and buses, desires to change location. PW-61, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

POSITIONS WANTED

GENERAL superintendent or manager; fifteen years' successful experience. PW-55, Electric Railway Journal, Tenth Ave. at 36th St., New York.

SUPERINTENDENT transportation; wide experience, successful record, city and interurban operation, desires position. High grade reference. PW-60, Electric Railway Journal, Tenth Ave. at 36th St., New York.

POSITIONS WANTED? Did you read the foregoing advertisements? Same thing applies in your case. A Searchlight Ad will introduce you to responsible officials and executives. Address "SEARCHLIGHT," Tenth Ave. at 36th St., New York City.

FOR SALE

15 BIRNEY SAFETY CARS

Brill Built

West. 508 or G. E. 264 Motors
Cars Complete—Low Price—Fine Condition

ELECTRIC EQUIPMENT CO.

Commonwealth Bldg., Philadelphia, Pa.

FOR SALE

Rotary Converters

2—G. E. Co., 300 kw. type T.C. 6-300-1200 form P. 1200 r.p.m., 60 cycle, 6 pole, 600 volt, direct current rotary converters.

Transformers

4—G. E. Co., 150 kw. type H, form SPQT 2300-v./370 v. O.I.S.C. transformers with reactance coils, field rheostat, aluminum cell lightning arresters, equalizer switches, starting switches. In first class condition. Low price.

Immediate Delivery

Tacony Housing Association

4921 Disston St., Tacony, Phila., Pa.

Searchlight Results:

Positions Vacant:

"The strongest proof that your Searchlight Department finds its way to many readers is shown by the numerous letters we have received in answer to our recent advertisement."

Secretary—A Connecticut Railway Co.

"You gave us one good man as a result of a similar advertisement in the Electrical Railway Journal some time ago. Please give us another."

Proprietor of Steel Sales Agency.

Positions Wanted:

"The result of advertising in the Searchlight Section of your Electric Railway Journal I have secured a position with The ——— Traction Co. of W. Va."

"I received 8 replies and accepted a position with the —— Railway Co. with over 30% increase in salary."

Business Opportunity:

Advertisement for investment to develop or acquire Traction Light & Pr. "The results from the advertisement in Electric Railway Journal have been satisfactory."

New York City Attorney.

Equipment For Sale:

"Our advertisement in the Electric Railway Journal located a buyer, and I have disposed of the car in question."

President—Buffalo Industrial Plant.

"We have disposed of all of our Girder Rails advertised in your paper. We are frank to tell you that the material went to three different traction lines and represents three separate and distinct new accounts. Our idea is that when it comes to bringing something to buyers in the traction field, there is but one sheet, and that is yours."

Dealer—New York City.

"There is no necessity for the continuation of this advertising, for the reason that we could have sold this equipment five times over from the advertisement that was run one time."

Superintendent—A Pennsylvania Railway Co.

Equipment Wanted:

"The two insertions of this advertisement which you displayed in admirable manner were sufficient to obtain for us the exact equipment that we desired."

Superintendent—A New England Railway Co.

For Every Business Want: "*Think Searchlight First*"

TRACTION AND ELECTRIC LIGHT

PROPERTIES *for* SALE

THE Railway properties serving the City of Binghamton and its suburbs together with Johnson City and Endicott on the west extending about ten miles from Binghamton, including Binghamton Railway Bus Lines operating a fleet of seventeen buses in and about the City of Binghamton, Johnson City and Endicott, and serving about 125,000 people and also the lighting property in Endicott and portions of the Town of Union will be sold under decree in foreclosure on Thursday, December 1st, 1927 at 2:30 P.M. at the general offices of the Binghamton Railway Co., 375 State Street, in the City of Binghamton, N. Y.

The railroad proper contains 47.72 miles of single and double track. The equipment consists of seventeen buses and 79 cars all in good condition together with all necessary railway and electric light paraphernalia including a plant at Binghamton.

Opportunity will be given anyone seriously interested in the property to thoroughly examine its records and the physical property.

The Court of Appeals recently determined the rate making power exclusively in the Public Service Commission. Increase of fare to ten cents with a strip of four tickets for thirty cents put in operation on October 16th, 1927.

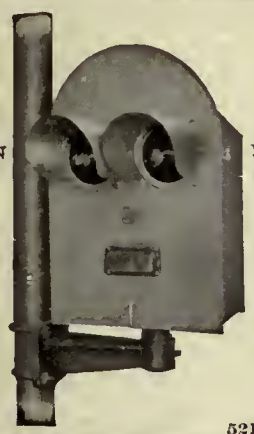
Binghamton proper has a population of about 80,000 and Johnson City, Endicott making up the other 45,000.

PARTICULARS OF SALE may be obtained from WILLIAM H. RILEY, special master to sell, 561 O'Neil Building, Binghamton, N. Y.

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier Inc., Barron G.
Air Brakes
General Electric Co.
Westinghouse Air Brake Co.
Anchors, Guy
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Armature Shop Tools
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
Automatic Return Switch Stands
Ramapo Ajax Corp.
Automatic Safety Switch Stands
Ramapo Ajax Corp.
Axles
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Cincinnati Car Co.
St. Louis Car Co.
Standard Steel Works Co.
Taylor Electric Co.
Westinghouse E. & M. Co.
Axles, Front
Shuler Axle Co.
Axles, Steel
Bethlehem Steel Co.
Babbitt Metal
National Bearing Metal Co.
Babbitting Devices
Columbia Machine Works & M. I. Co.
Badges and Buttons
Elec. Service Supplies Co.
International Register Co.
Batteries, Dry
Nichols-Lintern Co.
Bearings, Anti-Friction
Hyatt Roller Bearing Co.
Bearings and Bearing Metals
Bemis Car Truck Co.
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
Drew Elec. & Mfg. Co.
Eureka Copper Products Co.
St. Louis Car Co.
National Bearing Metal Co.
Taylor Electric Co.
Westinghouse E. & M. Co.
Bearings, Center and Roller Side
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
Stucki Co., A.
Bearings, Roller
Hyatt Roller Bearing Co.
Bearings, Roller and Ball
Timken Roller-Bearing Co.
Bells & Buzzers
Consolidated Car Heating Co.
Bells and Gongs
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
St. Louis Car Co.
Benders, Rail
Railway Trackwork Co.
Bodies, Bus
Brill Co., The J. G.
Cummings Car & Coach Co.
Fitzjohn Mfg. Co.
Lang Body Co.
St. Louis Car Co.
Body Material—Haskelite & Plymetl
Haskelite Mfg. Corp.
Boilers
Babcock & Wilcox Co.
Bond Testers
American Steel & Wire Co.
Elec. Service Supplies Co.
Bonding Apparatus
Amer. Steel & Wire Co.
Electric Railway Improvement Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Bonds, Rail
American Steel & Wire Co.
Drew Elec. & Mfg. Co.
Electric Railway Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.
Brackets and Cross Arms (See also Poles, Ties, Posts, etc.)
Columbia Machine Works & M. I. Co.
Electric Railway Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Brake Adjusters
Brill Co., The J. G.
Cincinnati Car Co.
National Railway Appliance Co.
Westinghouse Traction Br. Co.
Brake Shoes
American Brake Shoe & Foundry Co.
Bemis Car Truck Co.
Brill Co., The J. G.
St. Louis Car Co.
Taylor Electric Co.
Brake Testers
National Railway Appliance Co.
Brakes, Brake Systems and Brake Parts
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
General Electric Co.
National Brake Co.
Safety Car Devices Co.
St. Louis Car Co.
Taylor Electric Co.
Westinghouse Traction Brake Co.
Brakes, Magnetic Rail
Cincinnati Car Co.
Brushes, Carbon
Eureka Copper Products Co.
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
Westinghouse E. & M. Co.
Brushholders
Columbia Machine Works & M. I. Co.
Eureka Copper Prod. Co.
General Electric Co.
Bulkheads
Haskelite Mfg. Corp.
Bus Lighting
National Railway Appliance Co.
Buses
Cummings Car & Coach Co.
International Harvester Co.
Yellow Truck & Coach Co.
Buses, Gas, Electric
General Electric Co.
Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
Cables (See Wires and Cables)
Cambric Tapes, Yellow and Black Varnished
General Electric Co.
Irvington Varnish & Ins. Co.
Mica Insulator Co.
Carbon Brushes (See Brushes, Carbon)
Car Lighting Fixtures
Elec. Service Supplies Co.
Car Panel Safety Switches
Consolidated Car Heating Co.
Westinghouse E. & M. Co.
Car Steps, Safety
Cincinnati Car Co.
Car Wheels, Rolled Steel
Bethlehem Steel Co.
Cars, Dump
Brill Co., he J. G.
Differential Steel Car Co.
St. Louis Car Co.
Cars, Gas-Electric
Brill Co., The J. G.
General Electric Co.
Westinghouse Elec. & Mfg. Co.
Cars, Gas, Rail
Brill Co., The J. G.
St. Louis Car Co.
Cars, Passenger, Freight, Express, etc.
Amer. Car Co.
Brill Co., The J. G.
Cincinnati Car Co.
Cummings Car & Coach Co.
Kuhlman Car Co., G. C.
St. Louis Car Co.
Wason Car Co.
Cars, Self-Propelled
Brill Co., The J. G.
Cars, Second Hand
Electric Equipment Co.
Castings, Brass Composition or Copper
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
Eureka Copper Prod. Co.
National Bearing Metal Co.
Castings, Gray Iron and Steel
American Steel Foundries
Bemis Car Truck Co.
Columbia Machine Works & St. Louis Car Co.
Standard Steel Works Co.
Inc.
Wm. Wharton, Jr. & Co.,
Castings, Malleable & Brass
Bemis Car Truck Co.
Columbia Machine Works & M. I. Co.
St. Louis Car Co.
Catchers and Retrievers, Trolley
Earll, C. I.
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.
Ceiling Car
Haskelite Mfg. Corp.
Ceilings, Plywood Panels
Haskelite Mfg. Corp.
Change Carriers
Cleveland Fare Box Co.
Electric Service Supplies Co.
Change Trays
Cincinnati Car Co.
Circuit-Breakers
General Electric Co.
Westinghouse E. & M. Co.
Clamps and Connectors for Wires and Cables
Electric Railway Equipment
Electric Railway Improvement Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Cleaners and Scrapers, Track (See also Snow-Plows Sweepers and Brooms)
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
Coal and Ash Handling (See Conveying and Hoisting Machinery)
Coil Banding and Winding Machines
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
Westinghouse E. & M. Co.
Coils, Armature and Field
Columbia Machine Works & M. I. Co.
Elliot Thompson Co.
General Electric Co.
Westinghouse E. & M. Co.
Coils, Choke and Kicking
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
Coin Changers
Illinois Motive Equipment Co.
Johnson Fare Box Co.
Coin Counting Machines
Cleveland Fare Box Co.
International Register Co.
Johnson Fare Box Co.
Coin Sorting Machines
Cleveland Fare Box Co.
Johnson Fare Box Co.
Coin Wrappers
Cleveland Fare Box Co.
Commutators, Parts
General Electric Co.
Commutator Slotters
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
Westinghouse E. & M. Co.
Wood Co., Chas. N.
Commutators or Parts
Columbia Machine Works & M. I. Co.
Eureka Copper Prod. Co.
General Electric Co.
Westinghouse E. & M. Co.
Compressors, Air
General Electric Co.
Sullivan Machinery Co.
Westinghouse Traction Br. Co.
Compressors, Gas
Sullivan Machinery Co.
Compressors, Portable
Sullivan Machinery Co.
Condensers
Westinghouse E. & M. Co.
Connectors, Solderless
Westinghouse E. & M. Co.
Connectors, Trailer Car
Columbia Machine Works & M. I. Co.
Consolidated Car Heating Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Controllers or Parts
Eureka Copper Prod. Co.
General Electric Co.
Westinghouse E. & M. Co.
Controller Regulators
Elec. Service Supplies Co.
Controlling Systems
General Electric Co.
Westinghouse E. & M. Co.
Converters, Rotary
General Electric Co.
Westinghouse E. & M. Co.
Copper Wire
American Brass Co.
American Steel & Wire Co.
Anaconda Copper Mining Co.
Copper Wire Instruments Measuring, Testing and Recording
American Brass Co.
American Steel & Wire Co.
Anaconda Copper Mining Co.
Cord, Bell, Trolley, Register
American Steel & Wire Co.
Brill Co., The J. G.
Elec. Service Supplies Co.
International Register Co.
Roebling's Sons Co., J. A.
St. Louis Car Co.
Samson Cordage Works
Cord Connectors and Couplers
Elec. Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.
Couplers, Car
American Steel Foundries
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
Ohio Brass Co.
Westinghouse Tr. Br. Co.
Cowl Ventilators
Nichols Lintern Co.
Cranes, Hoist and Lift
Electric Service Supplies Co.
Eureka Copper Prod. Co.
Cross Arms (See Brackets)
Crossing Foundations
International Steel Tie Co.
Crossing, Frog and Switch
Ramapo Ajax Corp.
Wm. Wharton,Jr.& Co., Inc.
Crossing Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton,Jr.& Co., Inc.
Crossings
Wm. Wharton Jr. & Co., Inc.
Ramapo Ajax Corp.
Crossings, Track (See Track Special Work)
Crossings, Trolley
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Curtains & Curtain Fixtures
Brill Co., The J. G.
St. Louis Car Co.
Cutting Apparatus
Electric Railway Improvement Co.
General Electric Co.
Ohio Brass Co.
Railway Track Work Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.
Dealer's Machinery & Second Hand Equipment
Elec. Equipment Co.
Tacony Housing Corp.
Derailing Devices (See also Track Work)
Ramapo Ajax Corp.
Derailing Switches
Ramapo Ajax Corp.
Destination Signs
Columbia Machine Works & M. I. Co.
Electric Service Supplies Co.
Detective Service
Wish-Service, P. Edward
Door Operating Devices
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Heating Co.
National Pneumatic Co., Inc.
Safety Car Devices Co.
Doors and Door Fixtures
Brill Co., The J. G.
Cincinnati Car Co.
Hale-Kilburn Co.
St. Louis Car Co.
Safety Car Devices Co.
Doors, Folding Vestibule
National Pneumatic Co., Inc.
Drills, Rock
Sullivan Machinery Co.
Drills, Track
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Dryers, Sand
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Ears
Columbia Machine Works & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Electric Grinders
Railway Trackwork Co.
Electric Rivet Heaters
American Car & Foundry Motors Corp.
Electrical Wires and Cables
Amer. Electrical Works
American Steel & Wire Co.
Roebling's Sons Co., John A.
Electrodes, Carbon
Railway Trackwork Co.
Una Welding & Bonding Co.
Electrodes, Steel
Railway Trackwork Co.
Una Welding & Bonding Co.
Engineers, Consulting, Contracting and Operating
Beeler, John A.
J. Rowland Bibbins
Buchanan & Layng Corp.
Day & Zimmermann, Inc.
A. L. Drum & Co.
Faile & Co., E. H.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & DeLeuw
Linn & Marshall Co.
McClellan & Junkerafeld
Richey, Albert S.
Sanderson & Porter
Stevens & Wood, Inc.
Stone & Webster
White Eng. Corp., The J. G.
Engines, Gas, Oil or Steam
Waukesha Motor Corp.
Westinghouse E. & M. Co.
Exterior Side Panels
Haskelite Mfg. Corp.
Fare Boxes
Cleveland Fare Box Co.
Illinois Motive Equipment Co.
Johnson Fare Box Co.
Perey Mfg. Co., Inc.
Fare Registers
Electric Service Sup. Co.
Johnson Fare Box Co.
Fences, Woven Wire and Fence Posts
Acme Wire Co.
Amer. Steel & Wire Co.
Fenders and Wheel Guards
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Fender Co.
St. Louis Car Co.
Star Brass Works
Wood Co., Chas. N.
Fibre and Fibre Tubing
Westinghouse E. & M. Co.
Field Coils (See Coils)
Floodlights
Elec. Service Supplies Co.
General Electric Co.
Floor, Sub.
Haskelite Mfg. Corp.
Floors
Haskelite Mfg. Corp.
Forgings
Brill Co., The J. G.
Carnegie Steel Co.
Cincinnati Car Co.
Columbia Machine Works
Eureka Copper Prod. Co.
Standard Steel Works Co.
Frogs & Crossings, Tee Rail
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton,Jr.& Co., Inc.
Frogs, Track (See Track Work)
Frogs, Trolley
Electric Service Supplies Co
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Funnell Castings
Wm. Wharton, Jr. & Co., Inc.
Fuses and Fuse Boxes
Columbia Machine Works & M. I. Co.
Consolidated Car Heating Co.
General Electric Co.
Westinghouse E. & M. Co.
Garage Equipment
Columbia Machine Works & M. I. Co.
Westinghouse Tr. Br. Co.
Gas Electric Drive for Buses & Trucks
General Electric Co.
Gasoline
Standard Oil Co. of Indiana
Texas Company
Gas Producers
Westinghouse E. & M. Co.
Gates, Car
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
Gear Blanks
Bethlehem Steel Co.
Carnegie Steel Co.
Brill Co., The J. G.
Standard Steel Works Co.
Gear Cases
Chillingworth Mfg. Co.
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
Westinghouse E. & M. Co.
Gears and Pinions
Bemis Car Truck Co.
Bethlehem Steel Co.
Columbia Machine Works & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
National Railway Appliance Co.



SEND TODAY
for our Publication on
SAFETY
and
EFFICIENCY
in Electric Railway
Signals and
Crossing Bells

EST. 1865 AIMCO INC. 1915
"American" INSULATING MACHINERY COMPANY
REG. U.S. PAT. OFF.
521 Huntingdon St., Philadelphia, Pa.



Boyerized Parts:

Brake Pins
Brake Hangers
Brake Levers
Pedestal Gibs
Brake Fulcrums
Turnbuckles
Center Bearings
Side Bearings
Spring Post Bushings
Spring Posts
Bolster and Transom Chafing Plates
Manganese Brake Heads
Manganese Truck Parts
Bushings
Bronze Bearings
McArthur Turnbuckles

Can be purchased through the following representatives:

Economy Electric Devices Co.
72 W. Van Buren St., Chicago, Ill.
F. F. Dodier,
903 Monadnock Bldg., San Francisco, Cal.
W. F. McKenney,
54 First Street, Portland, Oregon.
J. H. Denton,
1328 Broadway, New York City, N. Y.
A. W. Arlin,
519 Delta Bldg., Los Angeles, Cal.

Bemis Car Truck Company
Springfield, Mass.



Type R-11
Double Register

International Registers

Made in single and double types to meet requirements of service. For hand or foot, mechanical or electric operation. Counters, car fittings, conductors' punches.

The International Register Co.
15 South Throop Street, Chicago, Illinois

Kalamazoo Trolley Wheels

The value of Kalamazoo Trolley Wheels and Harps has been demonstrated by large and small electric railway systems for a period of thirty years. Being exclusive manufacturers, with no other lines to maintain, it is through the high quality of our product that we merit the large patronage we now enjoy. With the assurance that you pay no premium for quality we will appreciate your inquiries.



THE STAR BRASS WORKS
KALAMAZOO, MICH., U. S. A.

RAILWAY UTILITY COMPANY
CAR COMFORT WITH
UTILITY
HEATERS
REGULATORS
VENTILATORS
2241-2247 Indiana St. Chicago, Ill.
Write for Catalogue
1328 Broadway New York, N. Y

Efficient Bus Heating
with
The N-L Venti-Duct Heater
THE NICHOLS-LINTERN CO.
7960 Lorain Ave. Cleveland, Ohio

ILLINOIS MOTIVE EQUIPMENT COMPANY
J. D. Elsom, President
RAILWAY AND AUTOMOTIVE SUPPLIES
35 EAST WACKER DRIVE, CHICAGO
WESTERN REPRESENTATIVES:
JOHNSON FARE BOXES
METAL TICKETS COIN CHANGERS





CHILLINGWORTH
One-Piece Gear Cases
Seamless—Rivetless—Light Weight
Best for Service — Durability and Economy. *Write Us.*
Chillingworth Mfg. Co.
Jersey City, N. J.

H B LIFE GUARDS
PROVIDENCE FENDERS
Manufactured by
CONSOLIDATED CAR FENDER CO., PROVIDENCE, R. I.
General Sales Agents
WENDELL & MacDUFFIE CO., 110 E. 42nd St., N. Y. C.

PS HEATERS

Car Heating and Ventilating
—are no longer operating problems. We can show you how to take care of both with one equipment. The Peter Smith Forced Ventilation Hot Air Heater will save, in addition, 40% to 60% of the cost of any other car heating and ventilating system. Write for details.
The Peter Smith Heater Company
6209 Hamilton Ave., Detroit, Mich.



STUCKI SIDE BEARINGS
A. STUCKI CO.
Oliver Bldg.
Pittsburgh, Pa.

Tool Steel Gear & Pinion Co.

Generators
General Electric Co.
Westinghouse E. & M. Co.

Girder Rails
Bethlehem Steel Co.
Lorain Steel Co.

Gongs (See Bells and Gongs)

Grease
Texas Company

Grinders and Grinding Supplies
Metal & Thermit Welding Co.
Railway Trackwork Co.

Grinders, Portable
Railway Trackwork Co.

Grinders, Portable Electric
Railway Trackwork Co.

Grinding Bricks and Wheels
Railway Trackwork Co.

Guard Rail Clamps
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.,Inc.

Guard Rails, Tee Rail and Manganese
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.,Inc.

Guards, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.

Harps, Trolley
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
General Electric Co.
National Bearing Metal Co.
Star Brass Works

Headlights
Elec. Service Snpplies Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

Headlining
Columbia Machine Works & M. I. Co.
Haskelite Mfg. Corp.

Heaters, Bus
Nichols-Lintern Co.

Heaters, Car (Electric)
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter

Heaters, Car, Hot Air and Wafer
Smith Heater Co., Peter

Heaters, Car, Stove
Smith Heater Co., Peter

Heaters, Electric Rivet
American Car & Foundry Motors Corp.

Helmets—Welding
Railway Trackwork Co.
Una Welding & Bonding Co.

Hoists and Lifts
Columbia Machine Works & M. I. Co.
Ford Chain Block & M. Co.

Hoists, Portable
Sullivan Machinery Co.

Hose, Bridges
Ohio Brass Co.

Hose, Pneumatic
Westinghouse Traction Brake Co.

Industrial Tractors
International Harvester Co.

Instruments, Measuring, Testing and Recording
American Steel & Wire Co.
General Electric Co.
National Railway Appliance Co.
Westinghouse E. & M. Co.

Insulating Cloth, Paper and Tape
General Electric Co.
Irvington Varnish & Ins. Co.
Mica Insulator Co.
Okonite Co.
Okonite-Callender Cable Co. Inc.
Westinghouse E. & M. Co.

Insulating Silk
Irvington Varnish & Ins. Co.

Insulating Varnishes
Irvington Varnish & Ins. Co.

Insulation (See also Paints)
Electric Railway Equipment Co.
Electric Service Sup. Co.
Irvington Varnish & Ins. Co.
Mica Insulator Co.
Okonite Co.
Okonite-Callender Cable Co. Inc.
Westinghouse E. & M. Co.

Insulation Slot
Irvington Varnish & Ins. Co.

Insulator Pins
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Insulators (See also Line Material)
Electric Railway Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hemingray Glass Co.
Irvington Varnish & Ins. Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Interior Side Linings
Haskelite Mfg. Corp.

Interurban Cars (See Cars Passenger, Freight Express etc.)

Jacks (See also Cranes, Hoists and Lifts)
Columbia Machine Wks.
Elec. Service Supplies Co.
Oil Jack Co.

Joints, Rail (See Rail Joints)

Journal Boxes
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.

Lamps, Guards and Fixtures
Elec. Service Sup. Co.
Westinghouse E. & M. Co.

Lamps, Arc and Incandescent (See also Headlights)
General Electric Co.
Westinghouse E. & M. Co.

Lamps, Signal and Marker
Elec. Service Supplies Co.
Nichols-Lintern Co.

Lanterns, Classification
Nichols-Lintern Co.

Letter Boards
Haskelite Mfg. Corp.
Nichols-Lintern Co.
Cincinnati Car Co.

Lighting Fixtures, Interior
Electric Service Supplies

Lightning Protection
Electric Service Sup. Co.
General Electric Co.
Westinghouse E. & M. Co.

Line Material (See also Brackets, Insulators, Wires, etc.
Electric Railway Equipment Co.
Electric Service Sup. Co.
Eureka Copper Prod. Co.
General Electric Co.
Hubbard & Co.
National Bearing Metal Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Locking Spring Boxes
Wm. Wharton, Jr. & Co., Inc.

Locomotives, Electric
Cincinnati Car Co.
Cummings Car & Coach Co.
General Electric Co.
St. Louis Car Co.
Westinghouse E. & M. Co.

Lubricating Engineers
Standard Oil Co. of Indiana
Universal Lubricating Co.

Lubricants, Oil and Grease
Standard Oil Co. of Indiana
Texas Company
Universal Lubricating Co.

Manganese Parts
Bemis Car Truck Co.

Machinery, Insulating
Amer. Insulating Mach. Co.

Manganese Steel Castings
Wm. Wharton, Jr. & Co., Inc.

Manganese Steel Guard Rails
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co., Inc.

Manganese Steel, Special Track Works
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co., Inc.

Manganese Steel Switches, Frogs and Crossings
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co., Inc.

Mica
Mica Insulator Co.

Mirrors, Inside and Ootside
Cincinnati Car Co.

Motor Buses (See Buses)

Motors, Generators & Controls for Gas Electric Buses
General Electric Co.

Motors, Electric
General Electric Co.
Westinghouse E. & M. Co.

Motorman's Seats
Brill Co., The J. G.
Cincinnati Car Co.
Electric Service Sup. Co.
Hale-Kilburn Co.
St. Louis Car Co.
Wood Co., Chas. N.

Nuts and Bolts
Bemis Car Truck Co.
Bethlehem Steel Co.
Cincinnati Car Co.
Hubbard & Co.

Oil
Texas Company

Oil Purifiers
De Laval Separator Co.

Omnibuses (See Buses)

Ovens
Young Brothers

Oxy-Acetylene (See Cutting Apparatus)

Packing
Westinghouse Traction Brake Co.

Paints and Varnishes
Electric Service Sup. Co.
Irvington Varnish & Ins. Co.
Mica Insulator Co.

Paints & Varnishes, Railway
National Ry. Appliance Co.

Panels, Outside, Inside
Haskelite Mfg. Corp.

Pavement Breakers
Sullivan Machinery Co.

Pickups, Trolley Wire
Drew Elec. & Mfg. Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Pinion Pullers
Drew Elec. & Mfg. Co.
Elec. Service Supplies Co.
Wood Co., Chas. N.

Pinions (See Gears)

Pins, Case Hardened, Wood and Iron
Bemis Car Truck Co.
Ohio Brass Co.
Westinghouse Tr. Brake Co.

Pipe Fittings
Standard Steel Works Co.
Westinghouse Tr. Brake Co.

Planers (See Machine Tools)

Plates for Tee Rail Switches
Ramapo Ajax Corp.

Pliers, Rubber Insulated
Electric Service Sup. Co.

Plywood (Roofs, Headlining Floors, Interior Panels, Bulkheads, Truss Planks)
Haskelite Mfg. Corp.

Pneumatic Tools
Ingersoll-Rand Co.

Pole Line Hardware
Bethlehem Steel Co.
Electric Service Sup. Co.
General Electric Co.
Ohio Brass Co.

Poles, Metal Street
Bates Steel Co., Walter
Electric Railway Equipment Co.
Hubbard & Co.
Union Metal Mfg. Co.

Pole Reinforcing
Hubbard & Co.

Poles, Ties, Posts, Piling and Lumber
International Creosoting Co.
Naugle Pole & Tie Co.
J. F. Prettyman & Son

Poles & Ties, Treated
International Creosoting Co.

Poles, Trolley
Bell Lumber Co.
Electric Service Sup. Co.

Poles, Tubular Steel
Electric Railway Equipment Co.
Electric Service Sup. Co.

Potheads
Okonite Co.
Okonite-Callender Cable Co. Inc.

Power Saving Devices
National Railway Appliance Co.

Pressings, Special Steel
Cincinnati Car Co.

Pressure Regulators
General Electric Co.
Westinghouse E. & M. Co.
Westinghouse Traction Brake Co.

Pumps, Air Lift
Sullivan Machinery Co.

Pumps, Vacuum
Sullivan Machinery Co.

Punches, Ticket
International Register Co.
Wood Co., Chas. N.

Rail Braces and Fastenings
Ramapo Ajax Corp.

Rail Grinders (See Grinders)

Rail Joints
Carnegie Steel Co.

Rail Joints—Welded
Lorain Steel Co.
Metal & Thermit Welding Co.

Rails, Steel
Bethlehem Steel Co.
Carnegie Steel Co.

Rail Welding
Metal & Thermit Welding Co.
Railway Trackwork Co.
Una Welding & Bonding Co.

Railway Safety Switches
Consolidated Car Heating Co
Westinghouse E. & M. Co.

Rattan
Brill Co., The J. G.
Cummings Car & Coach Co.
Electric Service Sup. Co.
Hale-Kilburn Co.
St. Louis Car Co.

Registers and Fittings
Brill Co., The J. G.
Cincinnati Car Co.
Electric Service Sup. Co.
International Register Co.
St. Louis Car Co.

Reinforcement, Concrete
Amer. Steel & Wire Co.
Bethlehem Steel Co.
Carnegie Steel Co.

Repair Shop Appliances (See also Coil Banding and Winding Machines)
Elec. Service Supplies Co.

Repair Work (See also Coils)
Westinghouse E. & M. Co.

Replacers, Car
Cincinnati Car Co.
Electric Service Sup. Co.

Resistances
Consolidated Car Heating Co
General Electric Co.

Resistance, Wire and Tobe
American Steel & Wire Co.
Westinghouse E. & M. Co.

Retrievers, Trolley (See Catchers and Retrievers, Trolley)

Rheostats
General Electric Co.
Mica Insulator Co.
Westinghouse E. & M. Co.

Rivet Heaters, Electric
American Car & Fdry Motors Corp.

Roofing, Car
Haskelite Mfg. Corp.

Roofs, Car & Bus
Haskelite Mfg. Corp.

Safety Control Devices
Safety Car Devices Co.

Sanders, Track,
Brill Co., The J. G.
O. M. Edwards Co., Inc.
Electric Service Sup. Co.
Nichols-Lintern Co.
Ohio Brass Co.
St. Louis Car Co.

Sash Fixtures, Car
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.

Sash, Metal, Car Window
Hale-Kilburn Co.

Scrapers, Track (See Cleaners and Scrapers, Track)

Screw Drivers, Rubber Insulated
Electric Service Sup. Co.

Seating Materials
Brill Co., The J. G.
Fitzjohn Mfg. Co.
Hale-Kilburn Co.
Haskelite Mfg. Corp.
St. Louis Car Co.

Seats, Bus
Brill Co., The J. G.
Hale-Kilburn Co.
St. Louis Car Co.

Seats, Car (See also Rattan)
Brill Co., The J. G.
Cincinnati Car Co.
Hale-Kilburn Co.
St. Louis Car Co.

Second Hand Equipment
Electric Equipment Co.
Tacony Housing Corp.

Shades, Vestibule
Brill Co., The J. G.
Cincinnati Car Co.

Shovels
Brill Co., The J. G.
Hubbard & Co.

Shovels, Power
Brill Co., The J. G.

Side Bearings (See Bearing Center and Side)

Signals, Car Starting
Consolidated Car Heating Co
Electric Service Sup. Co.
National Pneumatic Co., Inc.

Signals, Indicating
Nichols-Lintern Co.

Signal Systems, Block
Electric Service Sup. Co.
Nachod & U. S. Signal Co.
Wood Co., Chas. N.

Signal Systems, Highway Crossing
Nachod & U. S. Signal Co.

Signals, Warning
American Stombos Co.

Slack Adjusters (See Brake Adjusters)

Slag
Carnegie Steel Co.

Sleet Wheels and Cutters
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
Electric Railway Equipment Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
Eureka Copper Products Co.
National Bearing Metal Co.

Smokestacks, Car
Nichols-Lintern Co.

Snow Plows
National Railway Appliance Co.

Snow-Plows, Sweepers and Brooms
Brill Co., he J. G.
Columbia Machine Works & M. I. Co.
Consolidated Car Fender Co.
Cummings Car & Coach Co.
St. Louis Car Co.

Snow Sweeper, Rattan
J. G. Brill Co.

Soldering and Brazing Apparatus (See Welding Processes and Apparatus)

Special Adhesive Papers
Irvington Varnish & Ins. Co.

Special Trackwork
Bethlehem Steel Co.
Wm. Wharton, Jr. & Co., Inc.
Lorain Steel Co.

Spikes
American Steel & Wire Co.

Splicing Compounds
Westinghouse E. & M. Co.

Splicing Sleeves (See Clamps and Connectors)

Springs
National Railway Appliance Co.

Springs, Car and Truck
American Spiral Spring Co.
American Steel Foundries
Amer. Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
Standard Steel Works Co.
Taylor Electric Co.

Sprinklers, Track and Road
Brill Co., The J. G.
Cummings Car & Coach Co.
St. Louis Car Co.

Steel and Steel Products
American Steel & Wire Co.
Carnegie Steel Co.

Steps, Car
Brill Co., The J. G.
Cincinnati Car Co.

Stokers, Mechanical
Babcock & Wilcox Co.
Westinghouse E. & M. Co.

Stop Signals
Nichols-Lintern Co.

Storage Batteries (See Batteries, Storage)

Strain, Insulators
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Strand
American Steel & Wire Co.
Roeblings Sons Co., J. A.

Street Cars (See Cars, Passenger, Freight, Express, etc.)

Superheaters
Babcock & Wilcox Co.

Sweepers, Snow (See Snow Plows, Sweepers and Brooms)

Switch Stands and Fixtures
Ramapo Ajax Corp.

Switches
Eureka Copper Products Co.
General Electric Co.

Switches, Selector
Nichols-Lintern Co.

Switches and Switchboards
Consolidated Car Heating Co.
Electric Service Sup. Co.
Westinghouse E. & M. Co.

Switches, Tee Rail
Ramapo Ajax Corp.

Switches, Track (See Track Special Work)

Tampers, Tie
Railway Trackwork Co.

Tapes and Cloths (See Insulating Cloth, Paper and Tape)

Tee Rail Special Track Work
Bethlehem Steel Co.
Ramano Ajax Corp.
Wm. Wharton, Jr. & Co., Inc.

Telephones and Parts
Electric Service Sup. Co.

Telephone & Telegraph Wire
American Steel & Wire Co.
J. A. Roehlings Sons Co.

Testing Instruments (See Instruments, Electrical Measuring, Testing, etc.)

Thermostats
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter

Ticket Choppers & Destroyers
Electric Service Sup. Co.

Ties and Tie Rods, Steel
Carnegie Steel Co.
International Steel Tie Co.

Ties, Wood Cross (See Poles Ties, Posts, etc.)

Tires
General Tire Co.
Kelly Springfield Tire Co.

Tokens
Johnson Fare Box Co.

Tongue Switches
Wm. Wharton, Jr. & Co., Inc.

Tool Steel
Bethlehem Steel Co.
Carnegie Steel Co.

Tools, Track & Miscellaneous
Amer. Steel & Wire Co.
Columbia Machine Works & M. I. Co.
Electric Service Sup. Co.
Hubbard & Co.
Railway Trackwork Co.

Torches, Acetylene (See Cutting Apparatus)

Towers and Transmission Structures
Bates Exp. Steel Corp.
Westinghouse E. & M. Co.

"The Standard for Rubber Insulation"

INSULATED WIRES and CABLES

"Okonite," "Manson," and Dundee "A" "B" Tapes

Send for Handbook

The Okonite Company

The Okonite-Callender Cable Company, Inc.

Factories, PASSAIC, N. J. PATERSON, N. J.

Sales Offices: New York Chicago Pittsburgh St. Louis Atlanta Birmingham San Francisco Los Angeles Seattle

Pettingell-Andrews Co., Boston, Mass.
F. D. Lawrence Electric Co., Cincinnati, O.
Novelty Electric Co., Phila., Pa.

Con. Rep.: Engineering Materials Limited, Montreal.
Cuban Rep.: Victor O. Mendoza Co., Havana.



FARE
BOXES for BUSES

Let us tell you of this especially designed box for this class of service.

The Cleveland Fare Box Co.
4900 Lexington Ave., Cleveland, O.
Canadian Cleveland Fare Box Co., Ltd.
Preston, Ontario

COIN COUNTING And Sorting Machines CHANGE CARRIERS Tokens

Arc Weld Rail Bonds

AND ALL OTHER TYPES

Descriptive Catalogue Furnished

American Steel & Wire Company

New York Chicago Boston Cleveland Pittsburgh Denver
U. S. Steel Products Co.
San Francisco Los Angeles Portland Seattle

AMERICAN ELECTRICAL WORKS — AMELECTRIC — Wires and Cables — PHILLIPSDALE, R.I.

Reg. U. S. Pat. Office

AMELECTRIC PRODUCTS

BARE COPPER WIRE AND CABLE

TROLLEY WIRE

WEATHERPROOF WIRE AND CABLE

PAPER INSULATED UNDERGROUND CABLE

MAGNET WIRE

AMERICAN ELECTRICAL WORKS
PHILLIPSDALE, R. I.

Chicago, 20-32 West Randolph Street.
Cincinnati, Traction Bldg.: New York, 100 E. 42nd St.

NAUGLE POLES

WESTERN & NORTHERN CEDAR

NAUGLE POLE & TIE CO.

59 E. MADISON ST. CHICAGO ILL.

New York · Columbus · Kansas City · Spokane · Vancouver · Boston

Chapman Automatic Signals

Charles N. Wood Co., Boston



GOLD CAR HEATING & LIGHTING CO.

220 36th St., Brooklyn, N. Y.

ELECTRIC HEATERS WITH OPEN COIL OR ENCLOSED ELEMENTS
THERMOSTAT CONTROL—VENTILATORS

WRITE FOR NEW CATALOGUE

ANACONDA from mine to consumer

Rod, Wire and Cable Products

ANACONDA COPPER MINING COMPANY
THE AMERICAN BRASS COMPANY
General Offices - - 25 Broadway, New York

ANACONDA TROLLEY WIRE

ELECTRICAL WIRES and CABLES

ROEBLING

John A. Roebling's Sons Co., Trenton, N. J.

NACHOD & UNITED STATES SIGNAL CO., INC.

LOUISVILLE, KY.

BLOCK SIGNALS
FOR
ELECTRIC RAILWAYS
HIGHWAY CROSSING SIGNALS



HUBBARD

Hubbard and COMPANY

PITTSBURGH OAKLAND CHICAGO

SAMSON SPOT WATERPROOFED TROLLEY CORD



Trade Mark Reg. U. S. Pat. Off.
Made of extra quality stock firmly braided and smoothly finished
Carefully inspected and guaranteed free from flaws.
Samples and information gladly sent.

SAMSON CORDAGE WORKS, BOSTON, MASS.

ALPHABETICAL INDEX TO ADVERTISEMENTS

	Page
Acme Wire Co., The	47
American Brass Co., The	61
American Car Co.	63
American Car & Foundry Motors Corp.	Insert 11-12
American Electrical Works	61
American Insulating Mach. Co.	59
American Steel & Wire Co.	61
American Steel Foundries	6
American Stromboa Co., The	55
American Spiral Spring Mfg. Co.	Insert 946b
Anaconda Copper Mining Co.	61
Babcock & Wilcox Co.	51
Bates Exp. Steel Truss Co.	51
Beeler Organization, The	50
Bemis Car Truck Co.	59
Bethlehem Steel Co.	41
Bibbins, J. Rowland	51
Bridgeport Brass Co.	29
Brill Co., The J. G.	63
Buchanan & Layng Corporation.	50
Carnegie Steel Co.	55
Chillingworth Mfg. Co.	59
Cincinnati Car Co.	14-15
Cleveland Fare Box Co., The	61
Collier, Inc., Barron G.	42
Columbia Machine Works & M. I. Co., The	40
Consolidated Car Fender Co., The	59
Consolidated Car Heating Co.	51
Cummings Car & Coach Co.	17
Dayton Mechanical Tie Co.,	Insert 53-54
Day & Zimmermann, Inc.	50
De Laval Separator Co.	37
Differential Steel Car Co., The	52
Drum & Co., A. L.	50
Earll, C. I.	48
Electric Equipment Co.	56-57
Electric Railway Equipment Co.	49
Electric Railway Improvement Co.	40
Electric Service Supplies Co.	7
Elliott-Thompson Electric Co., The	52
Faile & Co., E. H.	50
Fitzjohn Mfg. Co.	8
Ford, Bacon & Davis, Inc.	50
Ford Chain Block Co.	946b
"For Sale" Ads.	57
General Electric Co.	20, Back Cover
General Tire Co., The	30
Gold Car Heating & Ltg. Co.	61
Graham Bros.	Insert 31-32-33-34
Griffin Wheel Co.	46
Hale & Kilburn Co.	35
Haskelite Mfg. Corp.	62
"Help Wanted" Ads.	56-57
Hemingway Glass Co.	48
Hemphill & Wells	50
Holst, Englehardt W.	50
Hubbard & Co.	41
Hyatt Roller Bearing Co.	36
Illinois Motive Equipment Co.	59
International Creosoting & Constr. Co.	39
International Harvester Co.	25
International Oxygen Co.	62
International Register Co.	59
International Steel Tie Co.,	Front Cover
Irvington Varnish & Insulator Co.	51
Jackson, Walter	50
Jeandron, W. J.	46
Johnson Fare Box Co.	48
Kerite Insulated Wire & Cable Co.	55
Kelker, DeLeuw & Co.	51
Kelly-Springfield Tire Co.	24
Kuhlman Car Co.	63
Laog Body Co.	Insert 43-44
Le Carbone Co.	46
Linn & Marshall, Inc.	50
Lorain Steel Co., The	52
McCardell Co., J. R.	46
McClellan & Junkersfeld	50
Mica Insulator Co.	55
Metal & Thermit Corp.	10
Nachod and United States Signal Co., Inc	61
National Bearing Metals Corp.	46
National Brake Co., Inc.	21
National Pneumatic Co.	13
National Railway Appliance Co.	52
Naugle Pole & Tie Co.	61
Nichols-Lintern Co., The	59
Ohio Brass Co.	5
Okonite-Callender Cable Co., Inc., The	61
Okonite Co., The	61
Perey Mfg. Co., Inc.	51
Positions Wanted and Vacant	56-57
Prettyman & Sons, J. F.	51
Railway Track-work Co.	4
Railway Utility Co.	59
Ramapo-Ajax Co.	59
Richey, Albert S.	50
Roebling's Sons Co., John A.	61
St. Louis Car Co.	18-19
Safety Car Devices Co.	16
Samson Cordage Works.	61
Sanderson & Porter	59
Searchlight Section	56-57
Shuler Axle Co.	47
Smith Heater Co., Peter	59
Standard Oil Co.	38
Standard Steel Works Co.	45
Star Brass Works.	59
Stevens & Wood, Inc.	50
Stone & Webster	50
Stucki Co., A.	59
Sullivan Machinery Co.	49
Tacony Housing Corp.	57
Taylor Electric Truck Co.	52
Texas Co., The	26
Tool Steel Gear & Pinion Co.,	Insert 946a
Una Welding & Bonding Co.	51
Universal Lubricating Co.	51
"Want" Ads	57
Wason Mfg. Co.	63
Waukesha Motor Co.	27
Westinghouse Electric & Mfg. Co.	2
Westinghouse Traction Brake Co.	9
Wharton, Jr. & Co., Wm.	52
"What and Where to Buy",	58-60-62
White Engineering Corp., J. G.	50
Willard Storage Battery Co.	28
Wish Service, The P. Edw.	51
Wood Co., Chas. N.	61
Yellow Truck & Coach Mfg. Co.,	22-23
Young Bros.	Insert 946b

WHAT AND WHERE TO BUY—Continued from page 60

Tower Wagons & Transmission Structures
MacCardell & Co., J. R.

Track Expansion Joints
Wm. Wharton, Jr & Co., Inc.

Track Grinders
Metal & Thermit Welding Co.
Railway Trackwork Co.
Ramapo Ajax Corp.
Una Welding & Bonding Co.

Track, Special Work
Bethlehem Steel Co.
Columbia Machine Works & M. I. Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co., Inc.

Trackless Trolley Cars
Brill Co., The J. G.
St. Louis Car Co.

Transfers (See Tickets)

Transformers
General Electric Co.
Westinghouse E. & M. Co.

Treads Safety Stair Car Step
Cincinnati Car Co.

Tree, Wire
Okonite Co.
Okonite-Callender Cable Co.

Trolley Bases
National Bearing Metal Co.
Ohio Brass Co.

Trolley Bases, Retrieving
Ohio Brass Co.

Trolley Bases
Brill Co., The J. G.
Westinghouse E. & M. Co.

Trolley Material (Overhead)
Electric Service Sup. Co.
General Electric Co.
National Bearing Metal Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Trolley Wheel Bushings
National Bearing Metal Co.
Star Brass Works

Trolley Wheels (See Wheels, Trolley)

Trolley Wire
American Brass Co.
Amer. Electrical Works
American Steel Foundries
Amer. Steel & Wire Co.
Anaconda Copper Min. Co.
Bridgeport Brass Co.
Roeblings Sons Co., J. A.

Trolleys and Trolley Systems
Ford Chain Block & M. Co.

Trucks, Car
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Cummings Car & Coach Co.
St. Louis Car Co.
Taylor Electric Co.

Trucks, Motor
International Harvester Co.

Truss Planks
Haskelite Mfg. Corp.

Tubing, Yellow and Black Flexible Varnish
Irvington Varnish & Ins. Co.

Turbine, Steam
General Electric Co.
Westinghouse E. & M. Co.

Turnstiles
Electric Service Sup. Co.
Perey Mfg. Co., Inc.

Turntables
Electric Service Supplies Co.

Valves
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Varnished Papers and Silks
Irvington Varnish & Ins. Co.

Ventilators
National Ry. Appliance Co.

Ventilators, Car
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Heating Co.
Nichols-Lintern Co.
Railway Utility Co.
St. Louis Car Co.

Vestibule Linings
Haskelite Mfg. Corp.

Welded Rail Joints
Electric Railway Improvement Co.
Lorain Steel Co., The
Metal & Thermit Corp.
Railway Trackwork Co.
Una Welding & Bonding Co.

Welders, Portable Electric
Electric Railway Improvement Co.
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Welders, Rail Joint
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.

Welding Processes and Apparatus
Electric Railway Improvement Co.
Metal & Thermit Welding Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Welding Steel
Electric Railway Improvement Co.
Railway Trackwork Co.
Una Welding & Bonding Co.

Welding Wire
American Steel & Wire Co.
Railway Trackwork Co.
Roebling's Sons Co., J. A.

Welding Wire and Rods
Railway Trackwork Co.

Wheel Guards (See Fenders and Wheel Guards)

Wheel Presses (See Machine Tools)

Wheels, Car, Cast Iron
Griffin Wheel Co.

Wheels, Car Steel & Steel Tire
American Steel Foundries
Bemis Car Truck Co.
Carnegie Steel Co.
Standard Steel Works Co.

Wheels, Trolley
Columbia Machine Works & M. I. Co.
National Bearing Metal Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Eureka Copper Prod. Co.
Star Brass Works

Wheels, Wrought Steel
Carnegie Steel Co.

Whistles, Air
Ohio Brass Co.
Westinghouse E. & M. Co.
Westinghouse Traction Brake Co.

Window Guards & Fittings
Cincinnati Car Co.

Wire Rope
Amer. Steel & Wire Co.
Roebling's Sons Co., J. A.

Wires and Cables
Acme Wire Co.
American Brass Co.
Amer. Electrical Works
Amer. Steel & Wire Co.
Anaconda Copper Min. Co.
Bridgeport Brass Co.
General Electric Co.
Kerite Insulated Wire and Cable Co.
Okonite Co.
Okonite-Callender Cable Co.
Roebling's Sons Co., J. A.
Westinghouse E. & M. Co.



Power consumption 2.4 K. w. h. per C. M.

Preliminary tests over 63.6 miles were made in Cleveland on the Brill 1928 Model Electric Car with most gratifying results. Its power consumption of 2.4 kilowatt hours per car mile, obtained through car meter reading, was accomplished with the car loaded aggregating 34,860 lbs. during the most congested hours when stops were most frequent. These figures, however, do not include transmission or conversion losses or energy consumed by lights, heater or air circuits. Nevertheless, they are sufficient to indicate comparatively the saving in power possible with this new type electric car.

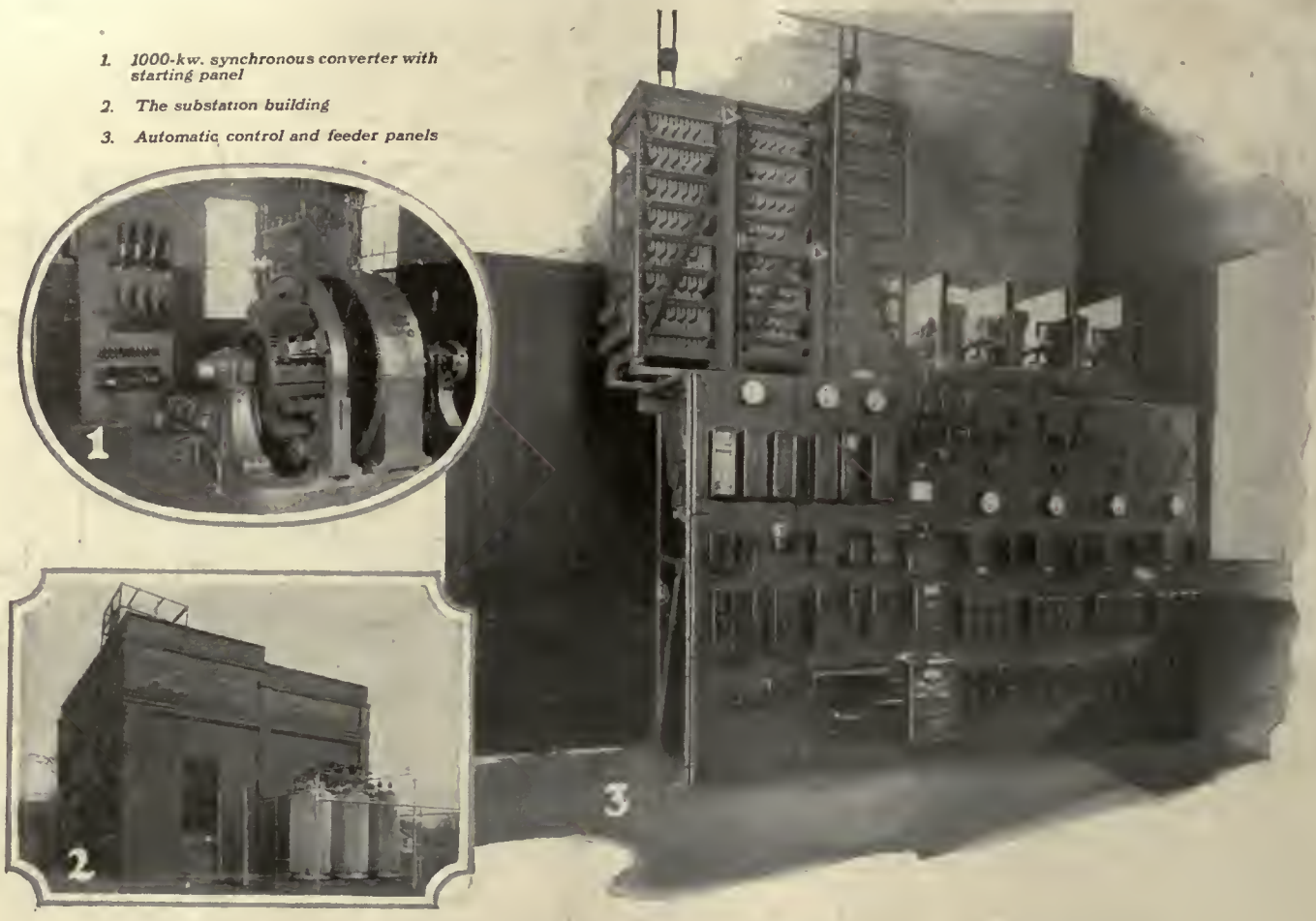
Brill 1928 Model Electric Car

More complete information on its performance will be mailed upon request.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.

AMERICAN CAR CO. ST. LOUIS, MO. — G. C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.

1. *1000-kw. synchronous converter with starting panel*
2. *The substation building*
3. *Automatic control and feeder panels*



Only 2 Outages in 2 years— and both were brief

The Owenton Automatic Substation of the Birmingham (Ala.) Electric Company, in operation since February 1925, has had only two outages. Neither was caused by failure of equipment inside the station. In both cases repairs were quickly made and operation was promptly resumed.

Power is brought into this station at 13,200 volts, 3 phase, 60 cycles, through the transformers to the starting equipment and to the machine. The four outgoing 600-volt d-c. feeders are each protected by Type JR high-speed circuit breakers.

A time switch starts service at 4:45 A.M. and automatically shuts it down at 8:30 P.M. During the day the voltage on the trolley circuit controls the action. If the voltage is high, the converter automatically shuts down; when the voltage is low the station automatically starts up.

The first automatic railway substation was placed in service by General Electric in 1914. The success of these early installations was so marked that the idea spread rapidly and there are now more than 325 G-E automatic switching equipments operating in railway service of all types.

130-2

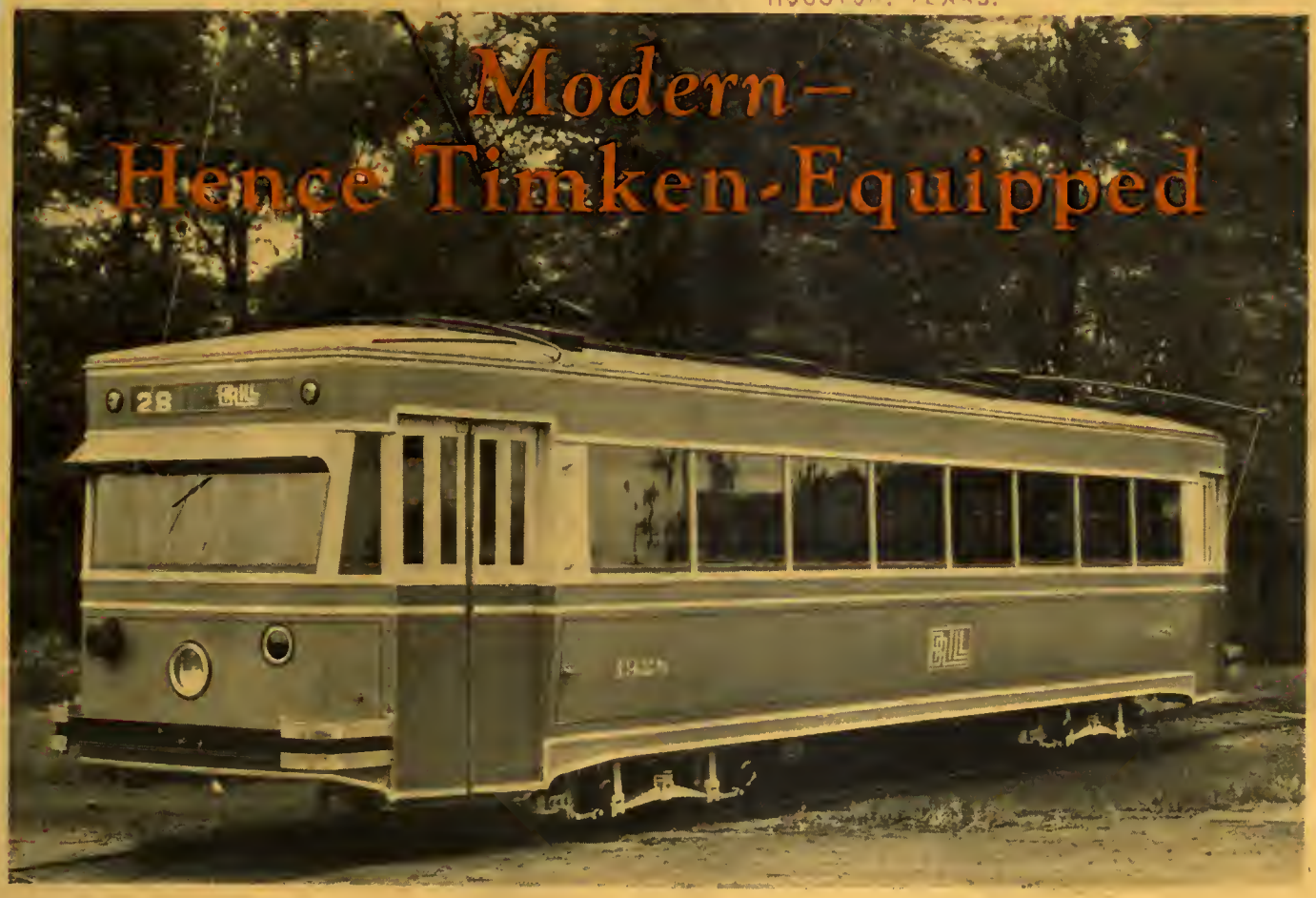
GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN PRINCIPAL CITIES

ELECTRIC RAILWAY JOURNAL

:Graw-Hill Publishing Company, Inc. NOVEMBER 26, 1927 Twenty Cents per Copy

HOUSTON PUBLIC LIBRARY
HOUSTON, TEXAS.



Designed to be the last word in modern revenue equipment for street railways, the Brill 1928 Model "lightweight" electric car has Timken Bearings not only in the journals, but on the Nuttall double reduction gear drives.

Timkens contribute to weight-saving, power economy, low maintenance cost, swift acceleration, quietness and general refinement. Timkens are the anti-friction bearings which make all this possible, because only Timkens have the endurance and thrust capacity for the sharp curves of electric railway tracks —the result of Timken tapered construction, Timken electric steel and Timken *POSITIVELY ALIGNED ROLLS.*

THE TIMKEN ROLLER BEARING CO., CANTON, OHIO

TIMKEN *Tapered Roller* **BEARINGS**





Four Inches
Nearer the Rail

W-N DRIVE cars are four inches nearer the rail—only two easy steps that women and children can easily board.

The costly and inconvenient ramp is entirely eliminated and a low, straight, attractive floor that is easy to walk on and comfortable to stand on greets the car rider after boarding.

The W-N Drive accomplishes this with the most compact gear unit ever designed for railroad drive and with a new type of high speed motor, the smallest ever used in street car service. This motor is so designed that 22-inch wheels can be used with greater clearance under the motor than was formerly possible with 26-inch wheels.

It gives to car designers and railway companies a freedom to apply improvements in design that will do much to attract patronage and to eliminate competition.

W-N Drive advantages

- Lowest steps
- Faster acceleration
- Quiet operation
- Motors spring born
- Gears run in oil
- Greater clearance
- Lighter weight
- Lower maintenance

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in All Principal Cities of the United States and Foreign Countries

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA
1927

Westinghouse

X95599

MORRIS BUCK
Managing Editor
JOHN A MILLER, JR.
Associate Editor
CLARENCE W SQUIER
Associate Editor
CARL W. STOCKS
Associate Editor

ELECTRIC RAILWAY JOURNAL

CHARLES GORDON, *Editor*

HENRY W. BLAKE
Senior Editor
GEORGE J. MACMURRAY
News Editor
O. W. JAMES, JR.
Assistant Editor
PAUL WOOTON
Washington Correspondent
ALEX McCALLUM
Editorial Representative
London, England

Vol. 70
No. 22

CONTENTS

Pages
971-1010

NOVEMBER 26, 1927

Editorials 971

Progressive Management Retrieves a Small Property .. 974
Facts given in the Coffin Prize brief show how a railway in a town of only 45,000 inhabitants changed the deficits to a surplus by studying the transportation needs of its community and then meeting these needs with modern equipment.

One-Man Operation Reduces Accidents in Little Rock 976

Operating Contract Plan for Philadelphia's Broad Street Subway 977
J. Rowland Bibbins, consulting engineer for the city, presents plan with novel features. Full city ownership and operation by private company are proposed.

Cars on Berlin Stadtbahn 981
BY HENRY W. BLAKE.
The design of the cars selected for this rapid transit road, now being electrically equipped, is given in detail. The electrical equipment includes a number of novel features.

Detroit Accident Record Improving 984

Rapid Transit Railways Now Serve Sydney, Australia 985
This system will be one of the most complete rapid transit electric railways in the world when lines now under construction or proposed are completed.

Signs That Promote Safety in El Paso 987

Valuation of Louisville Railway Has Novel Features .. 988
Report on cost of reproduction of the Louisville Railway recently made by the Beeler Organization uses latest Supreme Court decision as basis. Perpetual inventory method is recommended.

Maintenance Methods and Devices 991

New Equipment Available 993

American Association News 994

News of Other Associations 996

News of the Industry 997

Foreign News Notes 1003

Recent Bus Developments 1004

Financial and Corporate 1006

Personal Mention 1007

Manufactures and the Markets 1009

Your Co-operation Makes It Possible

EXECUTIVES of the industry have come to look forward to the Annual Statistical Number of ELECTRIC RAILWAY JOURNAL as an indispensable compilation of the year's facts and figures—presented early in the new year, while the facts are fresh and vital. In addition to the review of the past year which will be compiled, not in generalities but in facts and figures, the coming Annual Statistical Number will contain a forecast of activity for 1928—compiled from budgets and estimates furnished by the executives who control individual company expenditures.

The annual surveys that have written the record in each year's Statistical Number, of operating results, total capital and maintenance expenditures, car and bus purchases, fluctuations in railway costs and fares, security issues and maturities, receiverships and reorganizations, and track construction and reconstruction, will be continued. In addition to these surveys and the forecast of the industry's budget for 1928, this year's issue will include many new features. There will be even more thorough analysis, interpretation and graphical presentation of vital statistics than in previous years.

This service to the entire industry is made possible through the whole-hearted co-operation of individual property managements. There has always been a gratifying return to the JOURNAL's questionnaires. These are carefully condensed so as to require minimum time in furnishing the information required. Forms for this year's Statistical Number are now going into the mail. Your co-operation in submitting the data requested, as completely and promptly as possible, will aid in providing for you again a statistical review and forecast of the entire industry which is of timely interest when received, and which provides throughout the year an invaluable reference volume of essential facts and figures.

McGRAW-HILL PUBLISHING COMPANY, INC.
Tenth Avenue at 36th Street, New York, N. Y.
New York District Office, 285 Madison Ave.

JAMES H. McGRAW, President
JAMES H. McGRAW, JR., V.-P. and Treas.
MALCOLM MUIR, Vice-President
EDWARD J. MEHREN, Vice-President
MASON BRITTON, Vice-President
EDGAR KOBAK, Vice-President
C. H. THOMPSON, Secretary

WASHINGTON:
National Press Building
CHICAGO:
7 S. Dearborn Street
PHILADELPHIA:
1600 Arch St.
CLEVELAND:
Guardian Building
ST. LOUIS:
Bell Telephone Building
SAN FRANCISCO:
883 Mission Street
LONDON:
6 Bouverie Street, London, E. C. 4

Member Associated Business Papers, Inc.
Member Audit Bureau of Circulations

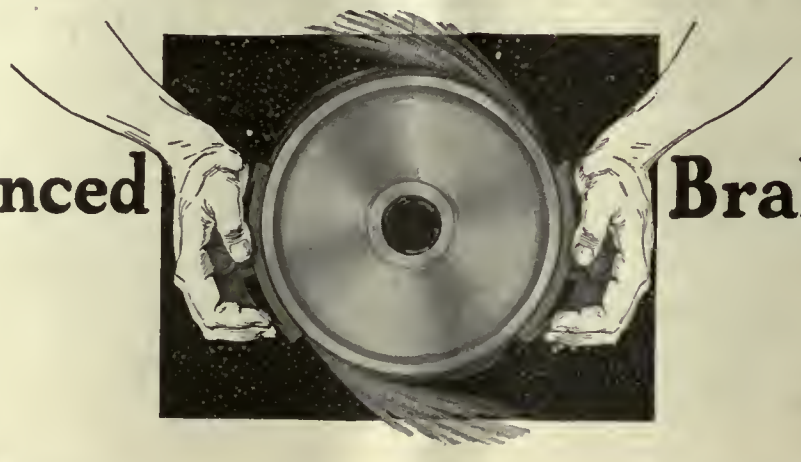
Cable Address: "Machinist, N. Y."

Publishers of
Engineering News-Record
American Machinist
Power
Chemical and Metallurgical Engineering
Coal Age
Coal Age News
Engineering and Mining Journal
Ingeniería Internacional
Bus Transportation
Electrical Railway Journal
Electrical World
Industrial Engineering
Electrical Merchandising
Radio Retailing
Construction Methods
Electrical West
(Published in San Francisco)
American Machinist—European Edition
(Published in London)

The annual subscription rate is $4 in the United States, Canada, Mexico, Alaska, Hawaii, Philippines, Porto Rico, Canal Zone, Honduras, Cuba, Nicaragua, Peru, Colombia, Bolivia, Dominican Republic, Panama, El Salvador, Argentina, Brazil, Spain, Uruguay, Costa Rica, Ecuador, Guatemala, Chile and Paraguay. Extra foreign postage to other countries $3 (total $7 or 29 shillings). Subscriptions may be sent to the New York office or to the London office. Single copies, postage prepaid to any part of the world, 20 cents.

Change of Address—When change of address is ordered the new and the old address must be given, notice to be received at least ten days before the change takes place.
Copyright, 1927, by McGraw-Hill Publishing Company, Inc.
Published weekly. Entered as second-class matter, June 23, 1908, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Printed in U. S. A.

Balanced Braking



In line with modern principles

Higher rates of retardation are demanded as a part of the program of speedier suburban and street railway service. With two brake shoes per wheel instead of one, the clasp brake is admirably suited to producing maximum retarding effect, with minimum strain and wear on truck and journal parts.

Balancing the heavy braking forces on opposite sides of the wheel has many advantages

1. **Less journal box wear.**
2. **Permits wheel to follow freely, vertical inequalities in track.**
3. **Makes use of flanged brake shoes practical.**
4. **Higher co-efficient of friction.**
5. **Divides energy absorption between two shoes, thus reducing heating effect from brake application.**
6. **Reduces frequency of brake shoe replacements on the car.**

AMERICAN STEEL FOUNDRIES

NEW YORK CHICAGO ST. LOUIS

American Multiple Unit Clasp Brake





Safeguards~ O-B Trolley Catchers and Retrievers protect your lines and your revenue

THEY *save* many of the minutes that cut down schedule speeds—minutes that are only too frequently consumed at congested intersections when trolley poles leave the wire. And they *prevent* major damage and costly repair bills for overhead lines.

On city cars, the O-B Catcher can be relied upon to stop a flying pole instantly and *hold* it where it is first caught. There is no danger of "Stepping up". Other features that win the approval of both the man on the car and the maintainer in the shop are its "One Shot" lubrication system and gravity operated reel latch.

Dependable in operation, simple and sturdy in construction, O-B Catchers give years of service without replacement of parts.

On interurban cars, where a jumping trolley pole must not only be stopped, but must be *pulled down* clear of the overhead quickly, the O-B Retriever is positive and prompt.

Even though the occasions for action on many cars may be few and far between, the savings effected in both operation and maintenance are a worth while factor in increasing net revenue.

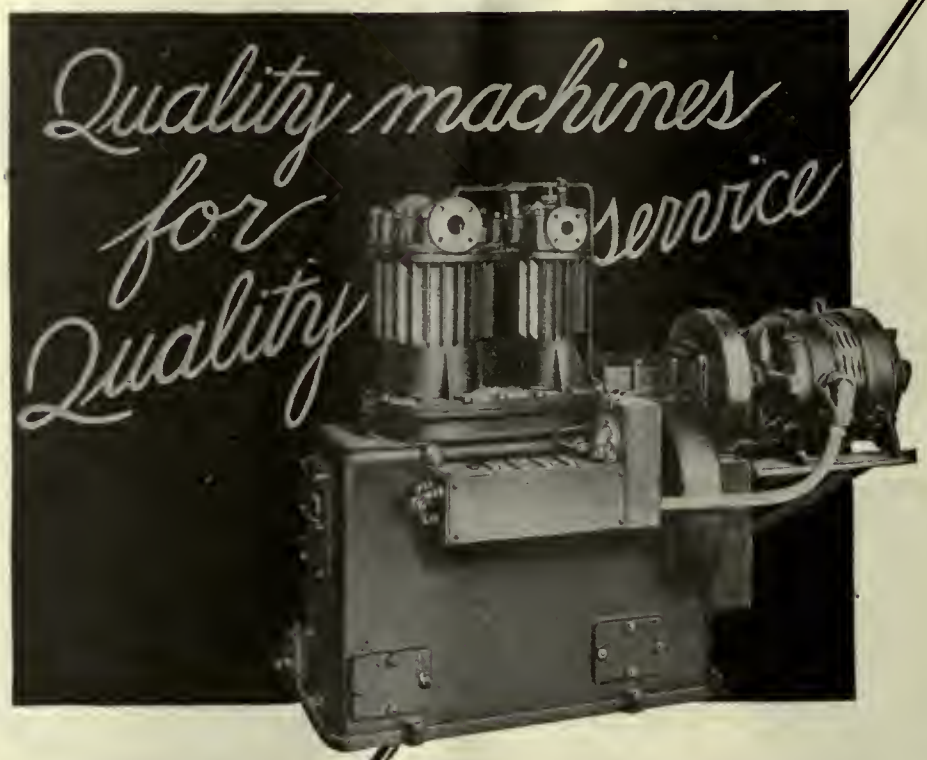
Folder 26-C, gives complete details. Address

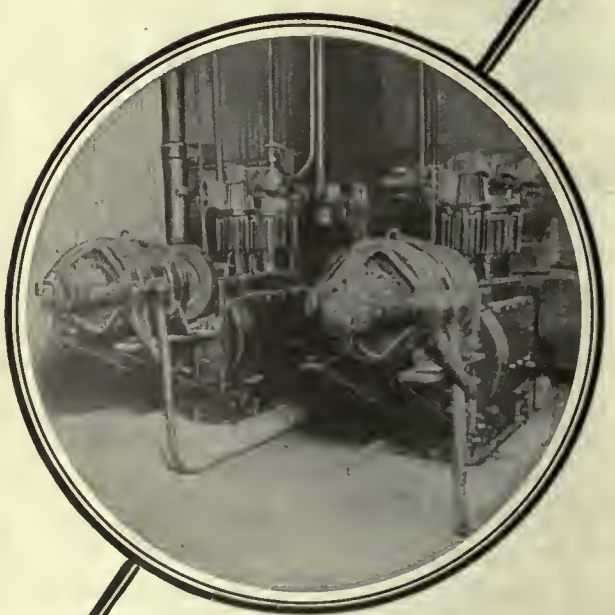
Ohio Brass Company, Mansfield, Ohio
Dominion Insulator & Mfg. Co., Limited
Niagara Falls, Canada
762C

Ohio Brass Co.

PORCELAIN INSULATORS
LINE MATERIALS
RAIL BONDS
CAR EQUIPMENT
MINING MATERIALS
VALVES

SALES OFFICES: NEW YORK CHICAGO PHILADELPHIA PITTSBURGH CLEVELAND SAN FRANCISCO LOS ANGELES





A typical installation of Westinghouse National Compressors, type 2VC, in railway repair shop service.

WESTINGHOUSE National Compressors embody the same careful design and precision in manufacture that has typified Westinghouse products for the past half century. These compressors are compact, self-contained, uniquely durable, absolutely reliable in action, simple in operation, and, due to their positive control feature, assure minimum power consumption.

Built in capacity sizes, ranging from 3 to 700 cu.ft. displacement, there is a Westinghouse National Compressor particularly suited to every pneumatic requirement, in the railway shop, power house, and maintenance department.

Westinghouse Traction Brake Company
General Offices and Works: Wilmerding, Pa.

9014

WESTINGHOUSE—NATIONAL
Air Compressors

Why Wood Ties?

START right at the track foundation —you've got a concrete base—an all important tie of some kind—a steel rail—and then steel wheels on the car. Why a wood tie?

Ask yourself these questions:

Does a wood tie strengthen the concrete?

Does a wood tie hold the rail permanently in place?

Does a wood tie outlast the rail and foundation?

Is a wood tie free from maintenance and replacement costs?

Is a wood tie satisfactory in all respects for paved track construction?

We doubled our business last year because Steel Twin Ties *are* satisfactory in every respect for paved track construction. Steel Twin Ties are going into the largest cities in the country—are standing the pound of the most severe traffic because they are specifically designed to do their job—and do it well. Wood never was.

Write today for delivered prices for your 1928 program.

THE INTERNATIONAL STEEL TIE CO.
CLEVELAND, OHIO

Steel Twin Tie Track

THE BASE OF MODERNIZATION



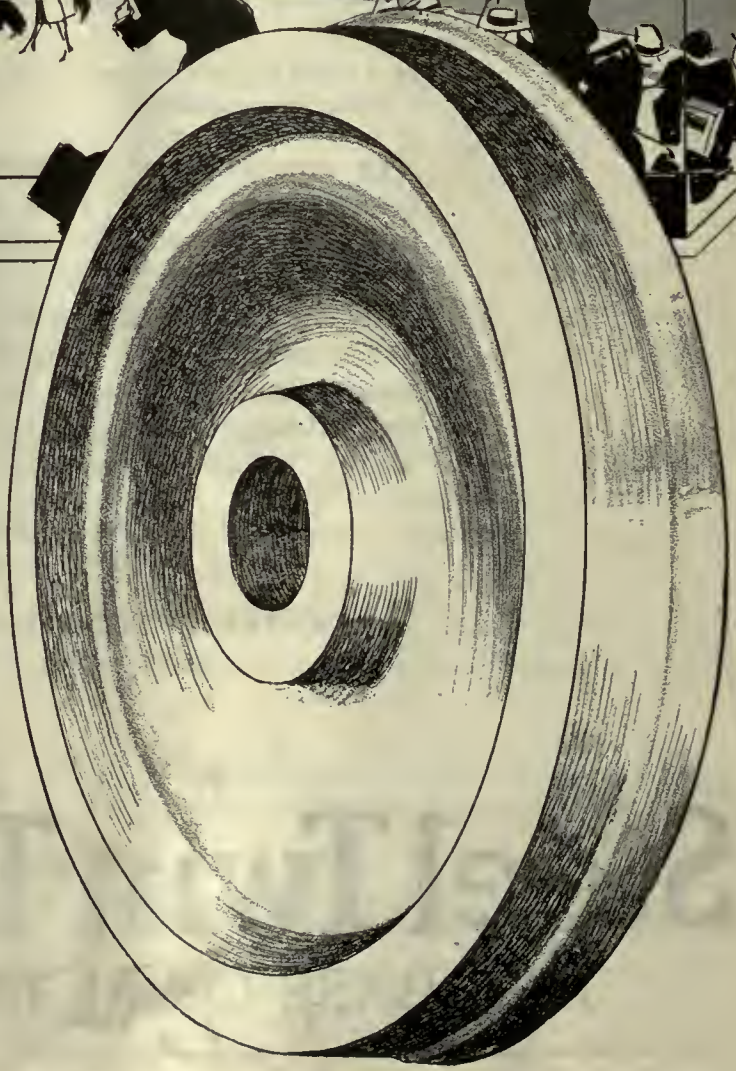
Underground, Overhead and on the Surface

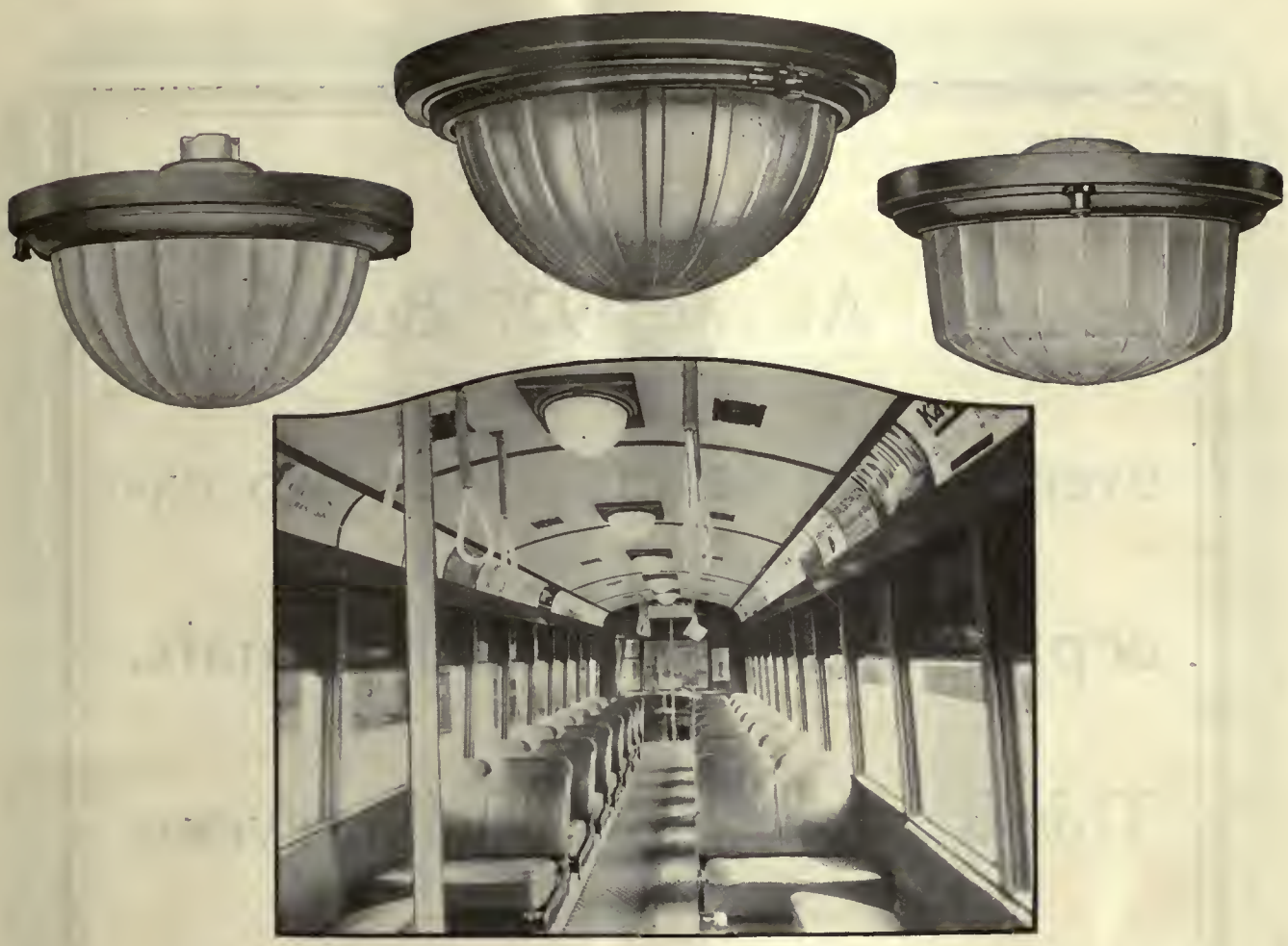
Underground, overhead and on the surface the electric railway works to carry out its titanic daily task—the movement of a large portion of the city's population in the narrow confines of the rush hour.

In such circumstances *dependability* must be the first requirement of electric railway equipment. GARY WROUGHT STEEL WHEELS are designed, made and inspected with this requirement in mind. Our wheel engineers are at your service.

Illinois Steel Company

General Offices: 208 South La Salle Street
Chicago, Illinois





Make your cars more attractive

with Dome Type Fixtures

One of the greatest ride selling features of modern cars is their attractiveness—their appeal to the public eye by means of proper lighting.

These Dome Type Lighting Fixtures are designed to provide not only this essential attractiveness but also the utmost comfort for passengers who wish to read while riding at night. For they produce a soft, pleasing well diffused light that eliminates all eye strain. They are substantially made to withstand extreme vibration.

We'll be glad to show you how new and interesting wiring plans may be adapted to your requirements.

Home office and plant at 17th & Cambria Sts., PHILADELPHIA; District offices at 230 So. Clark St., CHICAGO; 50 Church St., NEW YORK; Bessemer Bldg., Pittsburgh; 88 Broad St., Boston; General Motors Bldg., Detroit; 316 N. Washington Ave., Scranton; Canadian Agents, Lyman Tube & Supply Company, Ltd., Montreal, Toronto, Vancouver.

ELECTRIC SERVICE SUPPLIES CO.

MANUFACTURER OF RAILWAY, POWER AND INDUSTRIAL ELECTRICAL MATERIAL

At the 1927 Bus Show every make of bus, with two exceptions, was on Budd Duals. This is a repetition of all previous shows, and a true picture of the wheel situation in the bus industry.

Budd Duals

can't wobble



can't shimmy



and they stop sidesway



BUDD

WHEEL COMPANY

Detroit

Lower First Cost

permits

STUDEBAKER

to publish

Complete Prices



Heavy Duty Bus Chassis *by*

STUDEBAKER

On Time Every Time with

THE TRUE measure of value is not always in terms of dollars. But Studebaker with its vast manufacturing facilities is able to offer the most powerful bus chassis of its size and weight in the world, at the lowest first cost for a high quality chassis in the medium-capacity field. That is one reason why Studebaker always publishes complete prices.

Equally important is the remarkable performance of the Studebaker "75" Bus Chassis. Operating in crowded streets or on suburban and intercity runs, Studebaker busses maintain their schedules regardless of road or load—that is another measure of value.

Low cost of maintenance and low operating expense, which permit greater net profit, are responsible for the nation-wide popularity of Studebaker bus equipment.



20-Passenger Parlor Car De Luxe $6895 f. o. b. factory

The New STUDEBAKER 75 HEAVY

Comfort and Certainty

Comfortable lounging seats, wide windows, ample heating and proper ventilation—plus the easy riding qualities of Studebaker busses—insure a continued and profitable patronage.

When you buy Studebaker busses you are buying the product of a concern that has a background of 75 years of successful manufacturing experience.

STUDEBAKER BUS MODELS AND PRICES

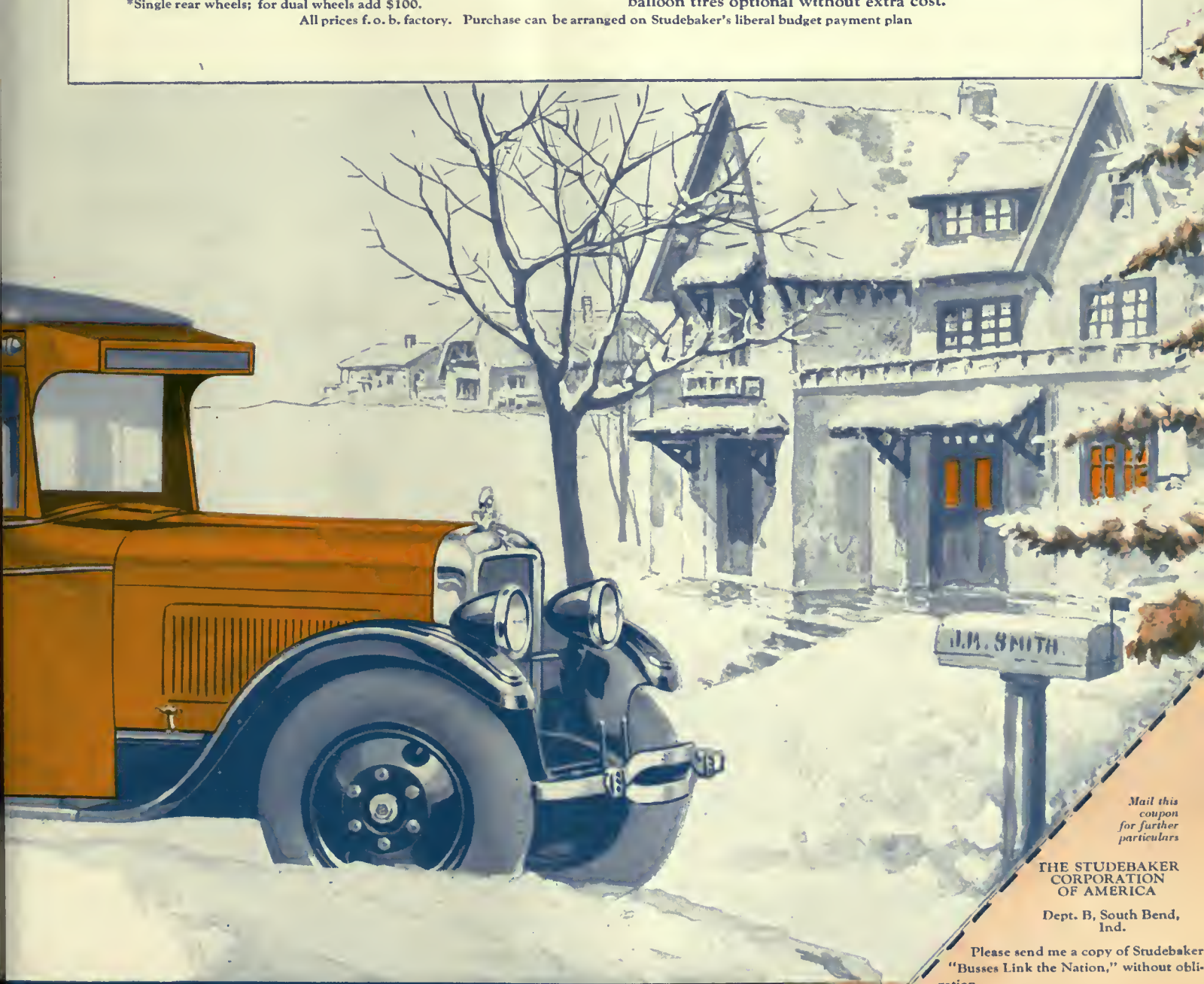
"75" Model—184-in. Wheelbase—Dual Rear Wheels, Chassis Only	$3275
19-passenger Cross-seat Sedan*	5675
21-passenger Street Car Bus	5895
22-passenger Parlor Observation Car	6895
20-passenger Parlor Car De Luxe	6895

*Single rear wheels; for dual wheels add $100.

"75" Junior Model—158-inch Wheelbase	
Chassis Only	$2410
12-passenger Cross-seat Sedan	4160
15-passenger Cross-seat Sedan	4520

Single wheel high-pressure tires or dual wheels and balloon tires optional without extra cost.

All prices f. o. b. factory. Purchase can be arranged on Studebaker's liberal budget payment plan



DUTY CHASSIS

Mail this coupon for further particulars

THE STUDEBAKER CORPORATION OF AMERICA

Dept. B, South Bend, Ind.

Please send me a copy of Studebaker "Busses Link the Nation," without obligation.

We have.....busses at present. Check below the Studebaker Bus about which you desire information. Type: Sedan ..... Parlor Car ..... Street Car Type ..... Capacity ..... Passenger.

Name .....

Address .....



One of the twenty-two Studebaker busses operated by the Wheeling, St. Clairsville & Cambridge Transportation Co.

Convincing Proof of Studebaker Bus Stamina and Economy

This letter from an experienced bus operator and the detailed analysis of the service rendered, together with exact cost figures, tell a powerful story. Similar reports from every section of the country give conclusive proof of the dependability of the Studebaker bus chassis.

The Wheeling St. Clairsville & Cambridge Transportation Company

Red Lines

St. Clairsville, Ohio
August 22, 1927

The Studebaker Corp. of America,
South Bend, Ind.

Gentlemen:

You will find inclosed picture of our latest type chair car body on the new 75 Studebaker Bus Chassis.

We have been operating Studebaker equipment on this division of the Red Star Lines for the past six years and will state that we are unable to find any Bus chassis on the market today that will equal Studebaker on all-around performance. Our present equipment consists of twenty 184-inch Bus chassis, chair car bodies and two of the new 75 Bus chassis.

We find in operating Studebaker equipment that our costs per Bus mile not including overhead does not run much over nine cents per mile and including overhead runs just a little over 16 cents per mile. I am inclosing operating cost sheet showing the cost per mile on our present Studebaker Bus equipment.

Yours very truly,

The Wheeling St. Clairsville & Cambridge Transportation Company

(Division) Red Star Lines

E. W. Smith,
President and Manager

The Wheeling, St. Clairsville & Cambridge Transportation Company

VEHICLE OPERATING COST

Per mile

Type of coach	Parlor car
Locality	Wheeling-Cambridge
Service	Interurban
Roads	Brick and tar bound
Topography	Very hilly
Average number of stops	Twelve in 50 mile run
Mileage per day	210 miles
Number of days operated per year	313 days
Annual mileage	65,000 miles

Direct costs—varying in total with mileage:

Gasoline (8 miles per gal.) at 16c per gal.	.02
Cylinder oil (420 miles per gal.) at 52c per gal.	.0012
Tire costs (25,000 miles per set) at $203.85	.0082
Maintenance and repairs (includes all cleaning, painting, repairs to body, inspecting and overhaul)	.03
Replacement reserve ($5,000—150,000 miles)	.033
Total per mile	.0924

Indirect costs—whether bus operates or not:

Taxes and license	.0052
Garage rent and storage	.004
Administrative and overhead	.01
Insurance—fire and liability	.01
Bridge toll, office, law, board meetings and misc.	.01
Drivers wages	.0350
Total per mile	.0742
Total vehicle cost per mile	.1666

STUDEBAKER 75 HEAVY DUTY CHASSIS

GARY, IND.



NP

FROM ZERO TO 34 CARS

One year ago there were no Treadle Exit Doors in operation on the electric railway cars in Gary, Indiana. By next January 1st, the Gary Railway Company will be operating 34 Treadle-Equipped Cars. This shows that it pays to "Step On It" in Gary, as in more than 60 other cities in the country.

Give this some thought in considering the use of the Circulating Load.

NATIONAL PNEUMATIC COMPANY

Executive Office: Graybar Building, New York

General Works: Rahway, New Jersey

CHICAGO
518 McCormick Building

MANUFACTURED IN TORONTO, CANADA, BY
Railway & Power Engineering Corp., Ltd.

PHILADELPHIA
1010 Colonial Trust Building

On the Better Motor Coaches



GRAMM

Every One is Leece-Neville Equipped

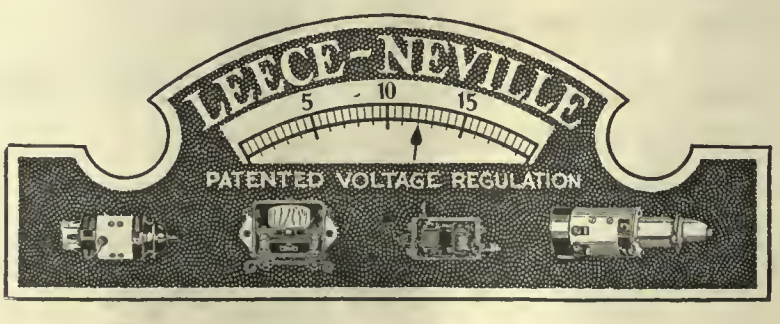
Practically all the builders of the better motor coaches standardize on Leece-Neville Voltage Regulation.

Operation is improved, electrical maintenance costs are reduced, battery life is prolonged.

The reason? Batteries cannot be overcharged! The charging rate is automatically and correctly regulated to the need of the battery. You needn't worry about "punch" in the batteries —it's always there. Records of running 125,000 miles, without removing the battery for repairs, have been established by Leece-Neville equipped motor coaches.

That tells the story.

You can avail yourself of this service. Write us. Address—



The Leece-Neville Company

5653 HAMILTON AVE., CLEVELAND, OHIO

The Rider's Division of his fare

When a man buys a ride on one of your cars what does he pay for? How would he figure the division of his fare?

Probably something like this:—a third for service, a third for comfort and a third for economy.

Right there is the rub of the transportation selling problem. It finds a logical answer in the Four Features of Cincinnati BALANCED Lightweight Car Design,—Speed with Safety, Capacity with Comfort, Beauty at Low Cost and Light Weight with Strength.

Cincinnati Car Company
Cincinnati, Ohio



CINCINNATI BALANCED LIGHTWEIGHT CARS

The Four Features of BALANCED DESIGN *are the Cardinal Points of Today's Demand*



One of the Goodyear-equipped motor bus fleet of The Montgomery Bus Company, of Bryn Mawr, Pennsylvania

GOODYEAR

Copyright 1927, by The Goodyear Tire & Rubber Co., Inc.

TRACTION
for starting, stopping, running

The All-Weather Tread on Goodyear Bus Tires is the most famous traction tread in the world.

This is a strong claim, but it is based on the fact that the public has bought millions more Goodyear All-Weather Tread Tires than any other kind.

And traction is an important factor in bus operation.

* * *

Buses have to make frequent stops and starts, and when they are ready to start they want no hesitation.

The All-Weather Tread with its sharp diamond-shaped blocks grips the road and goes.

On wet surfaces, the sharp edges of the All-Weather blocks scrape the film off and enable the tread to grip stoutly.

* * *

This unequaled tractive power is one of the reasons why bus operators like The Montgomery Bus Company, of Bryn Mawr, Pa., use Goodyear Bus Tires on all 27 of their buses serving various Philadelphia suburbs and connecting with the P. R. T. Surface and Elevated Lines.

This Company operates in a hilly country, with all the variety of weather conditions met in the East. They keep a very accurate record of tire performance, and know the tractive power, freedom from trouble, and dependable service of the Goodyear All-Weather Tread is real tire economy.

In 1926, their buses traveled over 1,300,000 bus miles and carried more than 3,000,000 passengers. In that service, Goodyears have practically eliminated road delays and schedule interruptions. In April last, for example, they had only four road delays in 600,000 Goodyear Tire miles.

Considering the high mileages obtained from Goodyears, that's tire satisfaction!

* * *

Combined with the safe, sure traction of the All-Weather Tread is the staunch, long-wearing casing quality provided by extra-elastic and extra-durable SUPERTWIST.

The result is a tire that gives uniformly fine performance at low tire-mile cost.

A tire that is worthy of "The Greatest Name in Rubber."

For every Goodyear Cord Bus Tire there is an equally fine Goodyear Tube, built especially to the needs of bus service

BUS TIRES

Made with SUPERTWIST

EAGLE-OTTAWA
"Good Leather"

This is one of the cars belonging to the Grand Rapids Street Railway System. The Grand Rapids Railway Company captured the annual C. A. Coffin Award at the recent Convention of the American Electric Railway Association held at Cleveland.

We point with pride to the fact that these cars are upholstered in Eagle-Ottawa COLONIAL GRAIN Leather, which is admittedly the finest upholstery leather ever made out of cattle hides. The attractiveness and luxury of the upholstering is a contributing factor to the success that the Grand Rapids Railway Company has achieved, which success earned the Corporation this signal honor.

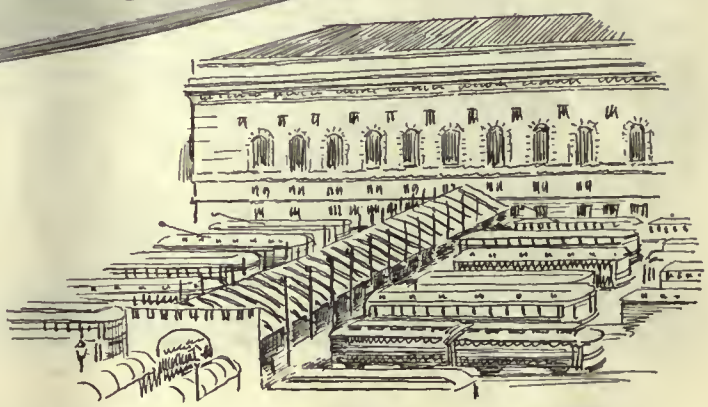
EAGLE-OTTAWA LEATHER COMPANY
Grand Haven, Mich.
BRANCH OFFICES:
569 Howard St., San Francisco, Calif.
912 W. Washington Blvd., Chicago, Ill.
74 Gold St., New York City



The World's Largest Tanners of Fine Upholstery Leather

Last Week



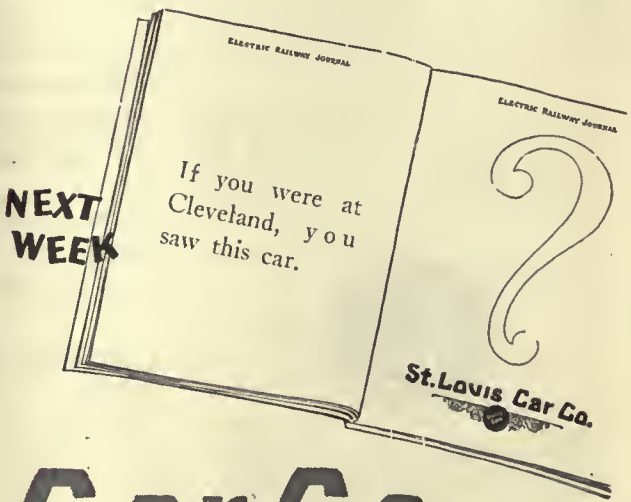


This week Your Opportunity

It's nobody's fault but our own if we neglect to take advantage of an opportunity to put our properties in order and boost rider sales.

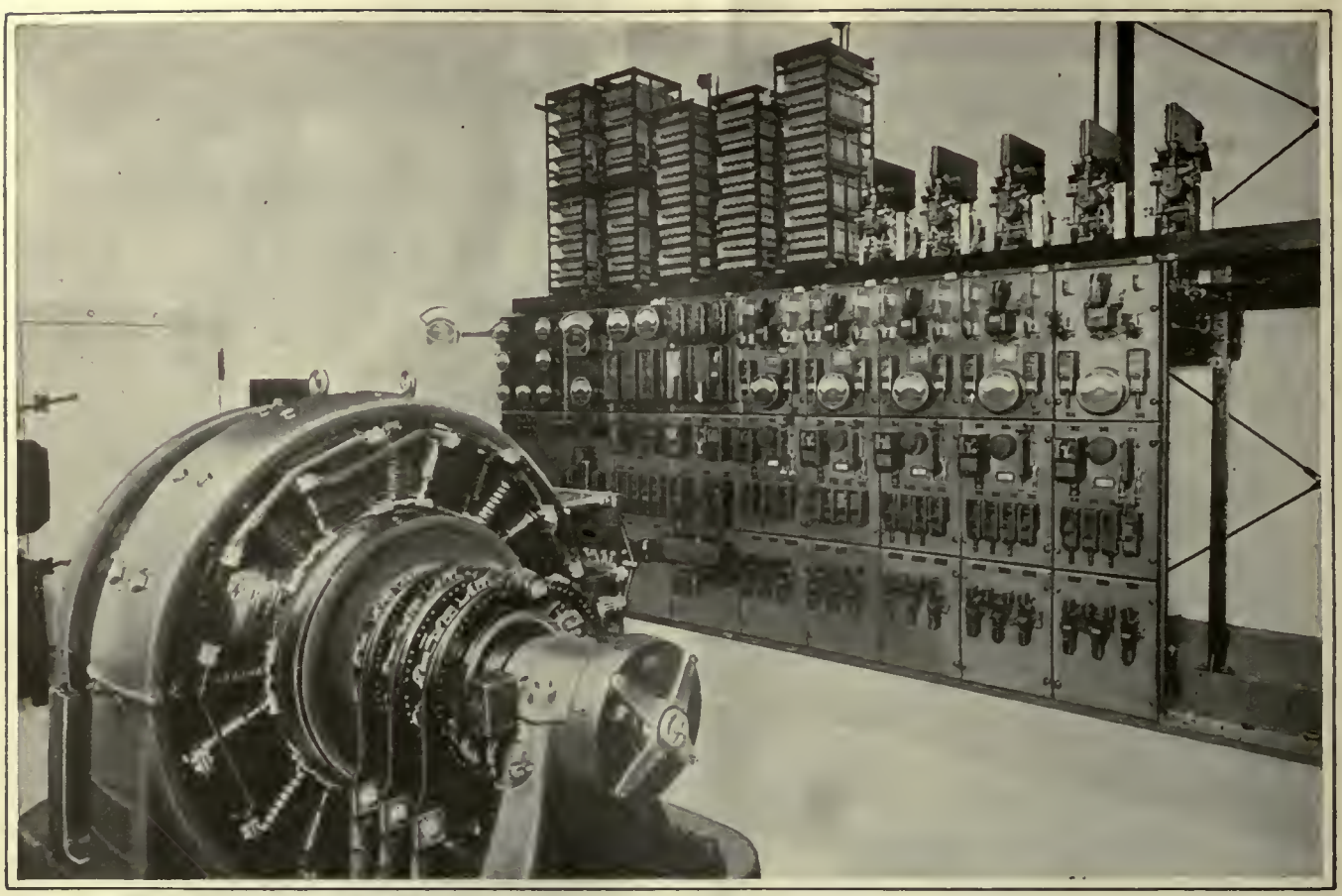
What we saw and heard at Cleveland—what Grand Rapids, Memphis, Chicago and other properties have done—what Houston is doing—these are typical examples of recognizing opportunity's knock and opening the door.

Cast aside prejudices—bury worn out grudges—look up and look ahead! See the street car *socially* attractively as well as mechanically efficient. Here's where you can sell rides at a profit. The time is opportune. We're ready to prove it!



St.Louis Car Co.

Quality Cars



Where Operating Charges were greatly reduced

The Los Angeles Railway is operating six G-E Automatic Substations for at least 60 per cent less than for similar manual stations. Over a period of four years the savings per substation have averaged better than $500 a month.

These six automatic stations have a total capacity of 7,500 kw. The detailed operating figures, given below, tell you why plans are now being made for four more.

The Los Angeles Railway has incorporated in its automatic substations the latest methods and equipment. These stations are made virtually soundproof, have air cleansers to minimize troubles caused by dust accumulation, and utilize forced air for both ventilation and cooling.

Operating Charges of Automatic Substations, Los Angeles Railway

Year	Monthly Average per 1,000 kw. Capacity					
	Repairs to Equipment		Labor of Operators		Supplies	
	Automatic	Manual	Automatic	Manual	Automatic	Manual
1922	$ 9.94	$52.77	$83.16	$277.14	$16.07	$ 8 35
1923	1.73	36.22	78.17	226.75	4.91	9 37
1924	5.75	60.24	79.80	247.76	11.13	15.02
1925	17.83	106.67	80 55	221.74	11.33	8.24
1926	20.72	61.99	83.89	220.80	12.68	8.86

130-3

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN PRINCIPAL CITIES

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review
Published by McGraw-Hill Publishing Company, Inc.
CHARLES GORDON, *Editor*

Volume 70 New York, Saturday, November 26, 1927 *Number 22*

Labor's Insistent Attitude

GREATLY to be deplored is the situation that confronts the Des Moines City Railway, just placed in the hands of receivers. It is a case with many angles, but no stigma attaches to the management for not trying to play its part in giving the city the best possible in the way of progressive operation. Some back history is essential to an intelligent understanding of the situation. The franchise under which the company operates was adopted in 1921, following a receivership of several years duration. It provided that the operating deficit then existing should be amortized out of expected earnings over a period of five years. Debenture bonds were issued to obtain funds with which to pay outstanding claims and lift the receivership. The earnings anticipated in the franchise provision for amortizing the old operating deficit were pledged as security for payment of the debentures.

As previously indicated, the management was thoroughly conscious of its obligations to the city. If the railway had sacrificed service and allowed the property to deteriorate the operating deficit might have been amortized and the debentures paid off. The management felt, however, that conditions would improve sufficiently to permit the issue to be refunded before maturity in April, 1927. Following adoption of the franchise nearly $1,500,000 was spent in rehabilitating and improving the property. Notwithstanding this effort the road continued to show losses and the debenture holders finally felt that it was necessary for them to act.

Among other moves in the modernization program the company sought to avail itself of one-man car operation as a constructive measure of economy only to run afoul of a long-time union agreement requiring the use of two men on each car. The court upheld the union on the letter of the law, but apparently not on its spirit. Just how the adamant attitude on the part of the officers of the local division of the Amalgamated squares with previous pronunciamentos of President Mahon of the union on the one-man car issue is difficult to understand, but the Des Moines local had its way. The use of one-man cars on a scale of operation indicated elsewhere in this issue would save the company about $250,000 a year, even allowing for extra trainmen in the loop district, the need for whom is very questionable. This sum would just about balance the operating deficit of $129,000 piled up by the company for the first nine months of 1927.

As the secretary of the union sees it, in no city of the country has the use of one-man cars resulted in a net lowering of fares which prevailed under two-man operation. That statement is, of course, open to challenge, but the point is that the use of such cars, evidenced in the case of Des Moines, has permitted many companies to continue without increasing their fares and thus save themselves and their employees, and at the same time permit them to give to the communities in which they operate the service to which the public is entitled.

It is a very shortsighted view of the matter that the representatives of the employees at Des Moines have taken, no less shortsighted in its way than is the attitude taken by the employees of the Schuylkill Railway of Girardville, Pa., reviewed in the article in ELECTRIC RAILWAY JOURNAL for Nov. 19. Certainly these two cases take no account, at least on the part of labor, of the mutuality of interests that should exist between capital and labor. Industry cannot do the impossible, but certainly here and there labor expects it to be able to do so, and in fact insists that it do so.

A Constructive Viewpoint Is Necessary for Progress

RECENTLY a new street car was inspected by a number of railway officials. In it the builder had made a sincere effort to work out a vehicle which would meet the conditions of present-day transportation demand from the standpoint of attractiveness and comfort, while at the same time recognizing the need for reasonable maintenance cost and operating reliability. The builder did not pretend that this was the last word in street cars, or that the equipment and fittings in this sample car were in all cases suitable for the operating conditions existing on properties where the class of patronage might not justify de luxe appointments. But in general design and arrangement, there was no reason in the world why the car in question was not entirely suitable for the "local conditions" on a hundred or more roads in widely variant situations.

Comment by two operating officials is both interesting and illuminating. This car was built with a particular view to improving the appearance of street cars by change from the awkward lines and proportions that are outstanding features of so many cars now in service. In fact, the design was the direct result of co-operation between a manufacturer and a railway operating official, who had given the matter of car appearance very careful study and analysis and had succeeded in working out one of the first successful forward steps that have been made in car appearance. To be sure, there was still room for improvement. The car under inspection was not the last word in possibilities by any means, and was considered even by the builder himself as purely experimental.

Under these conditions, the point of view of the two operating officials in question is worth consideration. One was a master mechanic. He had gone over the car and had discovered many costly features of equipment that he considered unnecessary and undesirable. In this respect he was probably right. But when his opinion was sought on the general proportions, arrangement and appearance of the car, his immediate reply was, "I could build a better-looking car myself."

Now this man was not a novice in the industry, and he had been connected with several railway properties in

the course of his experience. Yet there was no evidence that he ever even considered the need for better-looking cars, much less that he had ever undertaken the responsibility of attempting to make any improvement in conventional practice. Just as soon, however, as somebody else tried to take a forward step, his viewpoint was entirely critical, and he began to look for the bad features in the car rather than for its good points.

The second man's viewpoint was no less illuminating. He examined the design of the framing structure and was quick to note that a collision with a 5-ton truck piled high with freight would probably cause considerable damage. Just why he selected a 5-ton truck for his discussion is difficult to determine. He could have made out a much better case against the new car by commenting on the damage that would be done if it were hit by a steam locomotive. Yet would anybody seriously hold that street cars should be designed to withstand collision with a steam locomotive? If not, then why a 5-ton truck? Would this man's private automobile, in which he probably travels at much higher rates of speed than those attained by street cars, withstand collisions with a 5-ton loaded truck, or even a 1-ton truck for that matter? He depends on his brakes and not on his bumper to keep him out of the hospital when he is sharing the road with freight-carrying vehicles.

What does all this indicate? Doesn't it mean that there is still considerable room for straight thinking on the part of transportation men regarding the requirements in street car design to meet present-day conditions? In the very city from which the critical officials hail, the railway operation is being threatened by bus competition. But if the bus men undertook to design their vehicles to withstand collision with 5-ton trucks, it is probable that they wouldn't have much success in competing with even the dilapidated, awkward and obsolete cars that are operated on some of the rail lines in that city.

The industry will make little progress in the improvement of cars until there is a more receptive and constructive viewpoint on the part of operating executives than that displayed in the comments here recorded.

Boston's Latest Rapid Transit Line Embodies a New Principle

PARTICULAR interest attaches to the Dorchester extension of the Boston Elevated Railway system which was opened on Nov. 5. Not only is it an excellent piece of construction which will serve a large portion of the population in the southern section of Boston, but it embodies a principle in rapid transit expansion that has long been talked about but never adopted. That is the utilization of an existing steam railroad right-of-way for a rapid transit line, as distinguished from an electrified division.

In the Dorchester situation the Shawmut branch of the New York, New Haven & Hartford Railroad had been in use for many years, connecting the South Station in Boston with a terminal at Mattapan. The service given was as good as that on other suburban branch lines of the same company, but of course its value was limited, as the only station in the metropolitan district was too far from many of the activities of residents in the suburban territory. The purchase of the line by the city and its conversion to rapid transit service has been advantageous to the residents in two ways. First, the new line is an extension of the Cambridge subway, and when completed it will permit through rapid transit train service from Mattapan to Harvard Square, with transfer to the other lines of the Boston Elevated system reaching all parts of the metropolitan area. Second, the provision of transfer stations where residents of the district may change from the trains to surface cars and buses or *vice versa* makes for reduced travel time for everyone, whether living adjacent to a rapid transit station or at some distance away. Neither was possible with steam operation.

Many other steam railroad lines in the larger cities of this country are limited in capacity under existing methods, but would have tremendous possibilities if connected with the rapid transit lines, or used as a nucleus for a rapid transit system in a city not so served. In general they would furnish rights-of-way at much less cost than that incident to the construction of subways, and with less disfigurement to the city than the erection of elevated lines. The plan is worthy of study wherever rapid transit is contemplated.

Helping the Industry to Help Itself

PRESIDENT STEVENS is taking a decidedly forward and helpful step for the industry in appointing again this year a committee on electric railway finance, somewhat along the lines of the committee which functioned so effectively in 1925. Although electric railways have lagged seriously in taking the financial medicine recommended by the 1925 committee, there has been general agreement among those who are in a position to judge that voluntary readjustment of the financial structures of many properties, though a bitter pill for some security holders to swallow, is in many instances essential for the relief of a topheavy and distorted financial structure.

The former committee prepared figures to show the relatively small margin in electric railway earnings, for the industry as a whole, over fixed charges. Under these conditions, the high cost of money for capital additions, the high rate of interest that must be paid for refunding maturing obligations and the impossibility of raising new money through the sale of preferred stock, all constitute important obstacles to progress and improvement. Estimates were presented to show the relation between the earnings-to-fixed charges ratio and the cost of new money. These were carried out further to show the trend of net earnings under high fixed charge conditions in comparison with the results which would follow a voluntary scaling down of these fixed charges. The figures all gave convincing proof that the acceptance of junior securities by some present bondholders would result in the protection of existing investments through permitting operating companies to obtain needed new money on more favorable terms.

Unfortunately, the industry has been slow to carry out the recommendations of the 1925 finance committee. Through the appointment of a new committee this year it is to be hoped that the importance of this subject may again be brought home to the industry, to the end that financial readjustments vital to the establishment of more favorable credit may be brought about.

Another important step is contemplated by the formation of a sub-committee to study the possibility of working out an electric railway car trust plan that will make it possible for even small properties to acquire new cars on favorable terms of down payment, financing period and interest rate. This again is an important step in the direction of helping the industry to help itself.

The Staten Island Fiasco

FINIS will be written within ten days to former Mayor Hylan's abortive attempt to supply service by municipal operation of car and trolleybus on Staten Island after the local railway there had found it impossible to continue operation. On Dec. 5 the equipment, now nondescript, which has been in service there four or five years under city auspices, will be sold for what it will bring. Matters really came to an impasse last July when the Staten Island Edison Company cut off power because of the failure of the city to pay a debt of $175.000. Suspension of service followed on Aug. 1.

It was with the fanfare characteristic of the man that the former Mayor assumed the burden of operation on Staten Island under a 5-cent fare, with the city making up the difference between that rate and the actual cost of 12 cents per passenger. In five years the municipality, operating the trolley lines under lease from the receiver of a road that had previously been run privately, lost $375,000. In addition to this the trackless trolleys, on a total capital investment of about $275,000, showed a deficit of $300,000 in four years of city operation.

Meanwhile the Tompkins Bus Company is furnishing temporary service at a 10-cent fare and has been awarded permanent operating rights by the Board of Estimate under a 5-cent zoning plan, but is being required by the Transit Commission at a hearing on Nov. 25 to furnish proof of its financial standing. This company's buses, admittedly overcrowded, are doing the best they can under the circumstances, but the outlook is not rosy in the face of the fate of the privately run railway and of its successor, the municipal railway and trackless trolleys.

Surely Staten Islanders who listened to the speeches of the friend of the people made at the Restoration Hospital and at Tottenville at the time of the ceremony in connection with this ill-advised attempt by the city to do publicly what it had been found impossible to do privately must now be conscious that a vast gap often separates promise and practice, particularly when both are political.

Restoration Since Receivership in Brooklyn

ANOTHER excellent annual statement has been turned in by the Brooklyn-Manhattan Transit Corporation. The report, which is for the year ended June 30, 1927, shows an increase in the net income of $600,257 over the previous year. Total operating revenues were up $1,869,-625. The report serves to substantiate the statement made in the past about the excellent record of the company since the reorganization several years ago. The company may be handicapped by the failure of the city to meet its contractual subway obligations in connection with the construction of the Nassau Street loop subway and by the delay in the completion of the Eastern district rapid transit extension, but these omissions on the part of the city are not being allowed to militate against the company pushing its own "policy of keeping the properties in excellent condition and of furnishing as good service as possible, limited as to rapid transit lines by the facilities provided by the city."

These last are the company's own words, but they are borne out by the facts, evident even to the least observing of the road's own patrons. Reduced to tangible terms the company has expended $22,429,270 in the last two years for maintenance of way and structures and equipment, including reserves for depreciation. This is 24.5 per cent of the total operating revenue of $91,551,560 for the last two years. Two hundred and thirteen more cars have also been purchased. With no appreciable increase in mileage in the last ten years, the number of passengers carried by the rapid transit lines has increased from 265,400,020 to 658,271,663. At the same time the number of surface car riders has increased from 255,569,584 to 269,928,710, a figure that shows these lines to be holding their own well and serves to give the lie to those who would ignore them as factors in any plan for the unification of the transit facilities of the city. An annual report is an annual report in the sense that it does no screaming on its own account. It is too bad that the message of the report, necessarily submerged in the brief comments which it contains and the compilations of figures, will probably be lost to the general public, for back of these there is a real story—a romantic story of restoration since receivership.

Freight Business Can Be Sold

LATENT possibilities exist on many electric railways, even though they may not be discovered until the hour of dire need has approached. As an example of this, the Clinton, Davenport & Muscatine Railway, Davenport, Iowa, had reached the limit of economies in the installation of one-man cars, labor-saving devices, and improvements in the passenger service such as more frequent schedules and modernized cars. Still the net result of all these efforts merely resulted in retarding the rate of decrease of passenger revenue. For this reason it turned to the development of the freight business, more as the struggle of a dying man than with any great hope that it would bring prosperity.

The story of how the company purchased new freight locomotives, built sidings and transfer connections with the steam roads, established through rates and performed various other transitory operations was told by C. F. Dege, general superintendent of the company, before the Iowa Electric Railway Association at its recent meeting. But more of an accomplishment than the physical equipment to handle the business was the way the employees of the system organized to go out after business. The methods employed are commendable. Every employee became a salesman. This necessitated considerable effort on the part of the management to develop tact and courtesy, and to instill into the men the value of personal contact. They were taught so to approach the customers as to promote good will and to create in their prospects a feeling of confidence.

While the company secures a large amount of freight through solicitation by its trainmen, there are full-time solicitors and several department heads who at stated intervals visit the districts served by the interurban, assuring a complete coverage. Other practices which are bringing more business to the road are the careful handling of freight, inspecting the condition of goods upon receipt and delivery, minimizing delay at transfer points, notifying the consignee immediately on the arrival of a shipment, and advising the shipping association and traffic clubs of the company's activities.

Figures given by Mr. Dege prove that it pays to go after the business. In 1916 the interurban carried 30,432 tons of freight. Ten years later, in 1926, the gross tonnage was 194,586—more than six times as much. Moreover, he states, the company is convinced that the field has only been touched and that freight is destined to become the major source of revenue for the company. Surely this is a result worth pondering.



At this location—Five Points—three heavy traffic-bearing streets intersect. The safety zone installation here has resulted in a decrease of accidents

Progressive Management Retrieves a Small Property

Facts given in Coffin Prize brief show how a railway in a town of only 45,000 inhabitants changed the deficits to a surplus by studying the transportation needs of its community and then meeting these needs with modern equipment

DURHAM, N. C., has only about 45,000 inhabitants, and in respect to the size of the city served the brief submitted for the 1927 Coffin Prize by the Durham Public Service Company is unique. Modestly, its brief tells the history of this company during the past five years, a story replete with interest, especially to other properties of similar size, because it shows what can be done—and has been done—to bring such a property into good financial and physical shape.

Industrially, Durham is one of the leading cities of its state, being famous for its output of tobacco, textiles, hosiery, yarn and bag products. It is also an educational center, being the home of Duke University, and only 12 miles from the University of North Carolina.

The electric railway system dates from 1902 and operating conditions were favorable up to the outbreak of the World War. Then expenses increased rapidly, and though the company received two fare increases its net earnings were unsatisfactory. The downward trend in net continued until 1924, when the company was faced with the early need of spending $125,000 for track construction and paving, $36,000 to replace obsolete rolling stock and $13,000 as its part of removing a grade crossing within the city. This sum was in addition to $325,000 which the company had expended during the previous five-year period on roadbed, paving and rolling stock. The conditions prevailing with respect to gross and net earnings for the six-year period ended with June, 1927, are disclosed in Table I.

Co-ordinated Plan of Bus and Rail Operation Adopted

The first step taken in the constructive program was the adoption of a co-ordinated plan of bus and car operation on the basis of rendering a service which would attract public approval and patronage by meeting present-day demands for service with present-day methods. This meant that the entire routing plan had to be revised. During the previous ten years the city had grown rapidly in certain directions and its traffic arteries had changed. Some car routes were rendering a needed service, while others, aside from serving low-traffic-bearing areas,

showed heavy losses and no prospect of ever developing satisfactorily.

Poorly patronized routes without indication of future traffic increases and in bad physical repair as to track were immediately abandoned and bus operation substituted. In the first month of bus operation, March, 1925, approximately 8,000 bus-miles were operated with a bus-mile revenue of only 11.5 cents. The progressive increase resulting from the six months period is shown

TABLE I—SIX-YEAR STATEMENT OF EARNINGS AND EXPENSES DURHAM STREET RAILWAY AND BUS SYSTEM, AS OF TWELVE MONTHS ENDED JUNE 30

	Gross Revenue	Operating Expense*	Net Earnings
1922	$162,182	$155,440	$6,742
1923	165,945	143,470	22,475
1924	158,612	143,871	14,740
1925	147,074	152,919	(D) 5,845
1926	169,256	164,068	5,188
1927	196,329	188,085	8,245
1927†	200,250	177,840	22,410

* Replacement reserve included.
† Estimate for twelve months ended Dec. 31, 1927.
(D) = Deficit.

TABLE II—PROGRESSIVE INCREASES IN EARNINGS PER BUS-MILE AND PER CAR-MILE, DURHAM STREET RAILWAY SYSTEM

	Bus Operation		Electric Railway Operation	
Period Twelve Months Ended	Bus-Miles	Earnings Per Bus-Mile, Cents	Car-Miles	Earnings Per Car-Mile, Cents
June, 1925	55,861	14.9	738,808	20.3
December, 1925	190,706	16.7	620,816	19.1
June, 1926	363,761	17.9	508,883	20.4
December, 1926	487,789	18.9	438,231	22.0
June, 1927	575,808	19.2	359,297	23.8

in Table II, which also gives data on car-mile revenue. In the latter it will be seen that there was an improvement during 1927, as compared with 1925, of 3.5 cents in revenue, largely as a result of co-ordinated service and improved operating conditions. Incidentally it was found that the buses maintained an average speed in excess of 10 m.p.h., as compared with approximately 8 m.p.h. on the cars, as, with the exception of the trackage in the business area, the railway layout was single track with turnouts. Moreover, with the bus, it was found possible to enter new territory impossible of being served by rail operation.

Through Service Given

Experience with co-ordinated service showed soon that under Durham conditions so-called feeder operation was not popular and passengers on the buses must have a direct service into or through the business section.



At this particular factory approximately 1,000 negroes are employed. By the operation of special buses between this point and the negro residential district heavy patronage is secured and overcrowding of regular cars and buses with these passengers is eliminated

With the buses, also, the opportunity for chartered service returned. Chartered service with cars had long passed, but with buses the company is securing an increasing amount of business from lodges, schools and churches and for other prearranged trips. Considerable regular school business also is being done. As this chartered service ordinarily does not come at the same time as the maximum of demand of regular service, it increases the average daily miles operated per bus.

Types of Cars and Buses Operated

The cars now operated locally are modern light-weight, double-truck, one-man safety cars, and special endeavor has been made to maintain these cars in a well-painted, cleanly condition. All cars are repainted on regular schedule and, with the prevailing color scheme of deep orange and cream with black lettering and striping, have a very attractive appearance. Both cars and buses are washed outside and cleaned inside on regular schedule. Comment on the comfortable riding qualities of the buses led to the decision to replace existing seating equipment on the street cars with spring-edge, leather-upholstered seats and cushions, and this work is now progressing.

In its selection of type of bus the company made an extended study into the most desirable size for its conditions and decided on the 21-passenger bus. It attributes much of the success of its bus service to the fact that it did not purchase a larger vehicle. Improved operating



The substitution of bus operation for railway operation on this handsome boulevard has resulted in increased revenue and has obviated heavy track reconstruction costs

TABLE III—OPERATING STATEMENT, DURHAM BUS SYSTEM, TWELVE MONTHS ENDED JUNE 30, 1927
(Under A.E.R.A. Classification)

Acct. No.	Revenue	Amount	Per Bus-Mile
1201	Passenger revenue	$107,718.74	$0.18707
1203	Special (chartered service) revenue	1,653.20	.00287
1210	Station and bus privilege revenue	1,119.79	0.00194
1401	Total revenue	$110,491.73	$0.19188
	Expenses		
	I Maintenance of Plant and Equipment		
1301	Superintendence of plant and equipment	$997.20	$0.00173
1302	Maintenance of buildings and shop equipment	162.09	0.00028
1304	Maintenance of vehicles	12,031.97	0.02090
1306	Tires and tubes	6,875.24	0.01194
1311	Retirement reserve (accrued)	15,912.20	0.02763
	Total maintenance of plant and equipment	$35,978.70	$0.06248
	II Operating Garage Expense		
1315	Fuel for revenue vehicles (4 cents gas tax excluded)	$17,162.79	$0.02980
1316	Lubricants for revenue vehicles	1,929.31	0.00335
1317	Garage employees	2,566.18	0.00446
1318	Garage supplies and expenses	978.68	0.00170
	Total operating garage expense	$22,636.96	$0.03931
	III Transportation		
1320	Superintendence of transportation	$1,032.80	$0.00179
1321	Bus drivers' wages	27,120.68	0.04710
1325	Other transportation expense	3,648.53	0.00634
	Total transportation	$31,802.01	$0.05523
	IV Advertising Expense		
1330		49.40	0.00009
	V Administration and General Expenses		
1334	General offices, salaries and expense	$3,386.60	$0.00588
1335	Other general office salaries and expense	3,619.20	0.00629
1345	Liability and other insurance (injury and damage reserve)	1,543.92	0.00268
1351	Other general expense	.....	.....
	Total administration and general expense	$8,549.72	$0.01485
1403	Total operating expense	$99,016.79	$0.17196
	Net earnings before taxes	11,474.94	0.01992
1405	Taxes (includes 4-cent gas tax)	4,951.52	0.00860
	Net earnings	$6,523.42	$0.01132
	Total expense (plus taxes)	$103,968.31	$0.18056
	Plant and equipment		
1109	Motor vehicles	102,186.07	.....
	Buildings, etc. (not allocated at present)	.....	.....
	6 per cent interest on plant and investment	4,443.06	0.00771
1420	Net profits	$2,080.36	$0.00361

conditions were also secured, according to the brief, by the adoption for these vehicles of the vacuum booster brake system and of an extra high grade of paraffin-base Pennsylvania lubricating oil costing approximately 66 cents per gallon, instead of cheaper oil. In consequence largely of these two practices the maintenance of buses (account No. 1304 in the A.E.R.A. classification) has been kept to 2.09 cents per bus-mile. The entire bus operating expense for the period June 30, 1927, is given in Table III.

Three typical views of operating conditions on this property are published.

TABLE IV—OPERATING STATEMENT, RAILWAY DEPARTMENT' DURHAM, N. C., TWELVE MONTHS ENDED JUNE 30, 1927

	Annual	Per Car-Mile
A. Revenue		
Passenger revenue	$84,048.70	$0.2339
Miscellaneous transportation revenue	110.00	0.0003
Rentals and special privileges	1,679.45	0.0047
Total revenue	$85,838.15	$0.2389
B. Operating Expenses		
Maintenance of way and structures	$6,892.49	$0.0192
Maintenance of equipment	11,214.73	0.0312
Power	12,439.35	0.0346
Transportation	24,250.71	0.0675
Traffic (advertising)	80.57	0.0002
Carhouse expense	2,495.41	0.0069
General office salaries	2,723.63	0.0076
Injuries and damages	200.00	0.0006
Other general expense	7,430.15	0.0207
Taxes	4,816.39	0.0134
Replacement reserve	11,573.80	0.0322
Total expense	$84,117.23	$0.2341
C. Net earnings from operation	$1,720.92	$0.0048

The first shows Five Points, where three heavy traffic-bearing streets intersect, with considerable consequent street congestion. All car and bus routes pass through this intersection. The principal thoroughfare is only 37 ft. wide, but safety zones through which other traffic is not allowed to pass are maintained and have aided materially in safe operation.

A second view shows closing hour at one of the large tobacco factories in which approximately 1,000 negroes are employed. Special buses are operated between this point and the negro residential district and not only enjoy heavy patronage but help to relieve the overcrowding of the regular car and bus service with negro passengers.

The third view shows one of the streets on which railway service was abandoned and bus service substituted. Residents along this handsome boulevard never patronized the car service very much as they preferred their private cars. With attractive buses, business is growing.

One-Man Operation Reduces Accidents in Little Rock

STATISTICS of the Arkansas Power & Light Company relating to the accident record of its Little Rock property show a reduction in accidents following one-man operation. These statistics are presented in the company's brief for the 1927 Coffin Prize. In 1925, when two men were used for the car, the accidents of this company totaled 1,298. The following year, with one-man operation, the accidents were 169 less. This reduction is all the more notable because during the installation of one-man service there was a period when conductors had to be trained as operators and motormen had to be sought that could make change and issue transfers rapidly. During the first six months of 1927 the accidents were on an even lower ratio, being 550 for the half year.

The company follows an extensive safety program with each employee. It has a Safety First Committee composed of one employee from each department. This committee meets once a month to discuss safety problems and make a general inspection of the various departments. Recommendations are then made to the management of any changes which the committee believes will reduce accidents. In the majority of cases the recommendations are made effective immediately.

Monthly meetings attended by the trainmen are held in the clubrooms of the carhouse. They are also attended by the shop men, superintendent of transportation, master mechanic, supervisors, and the claim agent, and there is a general discussion of means for reducing accidents and improving the public service. In addition, every employee has an opportunity to offer suggestions for improving the service by depositing them in a suggestion box. These suggestions are considered at the regular monthly meeting.

Safety contests are also conducted among the operators. The men are grouped in teams of ten each, and individual records of accidents are marked up daily on a large blackboard in the carhouse. All accidents are recorded. At the end of the month a committee of five passes on all accident reports and those accidents which indicate carelessness or negligence on the part of the operator are charged against his record, as well as against the team to which he belongs. Cash prizes are paid at the end of the year to the three teams making the best record.

Operating Contract Plan

for Philadelphia's Broad Street Subway

J. Rowland Bibbins, consulting engineer for the city, presents plan with novel features. Full city ownership and operation by private company are proposed

ON NOV. 10 Mayor W. Freeland Kendrick of Philadelphia took the first official step in preparation for the operating of the new Broad Street subway by forwarding to Council, with his recommendations, the full report and operating agreement prepared by J. Rowland Bibbins of Washington, D. C., consulting engineer for the city of Philadelphia in these proceedings, as he also was in the fare case of 1925. It is the Mayor's stated ambition to conclude arrangements this year for subway operation during his administration, thus bringing into use the first and most important step of Philadelphia's standard gage, high-speed program.

The following discussion is abstracted from Mr. Bibbins' report.

Co-ordinated Operation and Contingent Return

A new type of operating contract has been designed by the engineer for the conditions peculiar to Philadelphia, the relative position of city and company set against the background of past and probable future growth and development. Philadelphia is the first city to undertake rapid transit trunk lines completely equipped and ready to run by any licensed operator, i.e., built complete out of city capital, of which around $100,000,000 will soon be invested in the Broad Street trunk, now nearly completed except the terminal extension to South Street.

In this contingent plan, which is essentially an operating agreement, the Philadelphia Rapid Transit Company is recommended as a licensed operator in co-ordination with its own system, for a trial term ending in 1936, about 8½ years, a sufficient time to enable both parties to gain needed experience to determine whether to carry on indefinitely. At that time and every four years thereafter the city has the right to review the agreement terms, and also the right of termination. This date is set in order to complete the major steps of the high-speed system authorized by the 1918 referendum. In 1957 the agreement is made co-terminous with the Frankford elevated lease and the 1907 city-company contract, so that the opportunity then presents itself for the city to consolidate all of the local transportation properties.

The major extension program assumed in this agreement covers only the essential lines of Broad Street to its South Street terminal, the Ridge Avenue-Eighth Street branch and the Walnut-Woodland subway-elevated to Darby, thus completing by 1935 the backbone of

Conclusions and Recommendations Summarized

1. *Recommended:* An operating agreement on the contingent return plan; city high-speed lines to be operated by P.R.T. as part of a city-wide transit system with co-ordinated feeders and the same fares, interline transfers and exchanges.

2. City has assumed the full financial burden of providing new rapid transit, hence it should receive the net revenues from city lines to support its investment. Under existing circumstances this will yield maximum city return.

3. Capital, revenues and operating expenses of the city lines to be kept separate and under continuous supervision of an experienced board of control, with appropriate city and company participation. Supervision is essential to the success of the contingent return plan, as a safeguard to the city's interests.

4. Estimated Broad Street subway earnings under this agreement are about $2,500,000 net for 1929, first year of full operation; or about 2.8 per cent on the total cost, $89,000,000, leaving about the same amount to be paid, at the start, out of taxation.

5. Broad Street subway is strategically located on the city's main traffic artery. North Philadelphia already holds over half the city's population and is growing in population and housing more rapidly than any other district. Nearly 700,000 people or two-thirds the population of this district live within the time-saving zone of influence of this subway and its feeder lines.

6. P.R.T. revenue has increased nearly $8,000,000 or 18 per cent in the two years following the last fare raise; and total traffic in 1926 was the highest in the history of the company, also revenue traffic (excepting post-war peak year 1920).

7. Company is relieved of financial responsibility of building and operating city lines and as the city's operator receives compensation commensurate with the magnitude of such operations.

8. The trial term ends in 1936, the city then having right of review and/or termination; likewise every fourth year thereafter. Term of agreement ends 1957.

9. Extensions covered during the trial term relate only to those authorized by referendum, i.e., Broad Street terminals and Walnut-Darby lines; other desired extensions to be included by mutual agreement.

10. *Recommended:* Frankford elevated lease under existing, practical conditions may well stand as it is, separate from the Broad Street agreement, but if by mutual agreement it can be made fully coterminous therewith, including right of review, this should be done so that some minor features may later be clarified. The non-standard track gage and size of cars and the physical connection with Market Street indicate the reasonableness of this course.

the city high-speed lines to the north and the southwest, which, together with the present Market-Frankford elevated-subway trunk to the west and northeast, furnishes the main axial system of rapid transit. Other extensions and branches are provided for by mutual agreement but may become mandatory on the first date of review, 1936, or succeeding four-year periods.

Transportation at Minimum Cost Is Provided for

This plan, it is believed, will secure: (1) The transportation essential to continued growth at less cost than by any other available plan; (2) public ownership (by necessity rather than choice) and private operation; (3) co-ordinated development with minimum risk to both parties; (4) a saving of 1½ to 2 per cent in fixed charges, and (5) a minimum burden on the taxpayer, resulting from the use of the city's financial reservoir to tide over early deficits later absorbed by growing traffic.

The engineer's estimates based on elaborate riding habit counts of previous years (P.R.T. origin-destination counts), also growth trends and forecasts of population and housing, indicate the Broad Street system under this co-ordinated plan would earn in its first full year, 1929, about $2,500,000 net or 2.8 per cent on its investment, leaving only about a like amount to be paid from taxes for fixed charges, including sinking fund. This return will rise gradually after each stage of new construction, due to increasing traffic, and drop temporarily as each new extension goes into service. By 1936, with an investment about three-fourths greater than initially, after the Walnut-Woodland elevated-subway line to Darby is put into operation, the estimated revenues will about double and the estimated net return on the city's investment will be somewhat greater than in 1929. All of these estimates apply only to co-ordinated operation.

Although differential fares might possibly be justified in the future, the agreement was based upon a fare system uniform with that of the present lines and buses, requiring some adjustment of the company surface lines to provide feeder service. In order to avoid accounting complications, fares on interline riding are to be pooled and split equally, so that the company receives proportionate revenue for its short-haul feeder lines and the city for its high-speed trunk service.

Thus co-ordinated operation becomes an inherent element of the plan. According to the engineer this status is quite different from so-called "unified operation," which most generally results in so complex a situation of "scrambled" capital and operating accounts as to defy reasonable allocation at times of desired resettlements. In this agreement the city's accounts are to be kept entirely separate, likewise the physical property and operations. But to the passenger, the system is completely co-ordinated.

Operator's Compensation Based on Net Earnings

The city lines will bear all of the operating costs and appropriate compensation of all of the personnel required. In addition, some incentive to active traffic development and operating efficiency is embodied in the agreement by a sliding-scale compensation proportionate to the magnitude of operations based upon 3 per cent of the net earnings of the city lines. Here it is to be remembered that the operator as such is relieved of the necessity of financing both construction and operation of city lines. On this point the engineer states:

> The subway will of course affect adversely slower parallel surface lines and activate the crosstown feeder lines. But in view of the evident consideration given by the Public Service Commission to such a probability [undertaking the city lines operation] in sustaining the 7½-8 cent fare, and from my study of available P.R.T. railway statements and other records pertaining to the company's position today, the conclusion appears to me to be justified that, under the present fare, the company should be able to continue the operations of its own lines without financial embarrassment from additional Broad Street subway operation under this agreement. This assumes, of course, normal levels of budget expense operations and of overheads generally current on equally modern systems.

Bearing upon this, it is pointed out that:

> Total riding in 1926 exceeded that of 1925 and with bus traffic exceeded that of any year in the history of the company; likewise revenue traffic excepting only the post war peak of 1920; and passenger revenues, railway and bus, increased nearly $8,000,000 or 18 per cent in the two years following the last fare raise. Thus the net result upon the P.R.T. system under the proposed co-ordinated plan will probably be to sustain the surface system as a whole and at least to avoid the decline thereon which would immediately ensue if the city were forced to resort to full independent operation.

The company, in normal operation, submits annually operating, maintenance and capital budgets and upon the board's approval, Council's authorization of new capital funds is requested, and drafts upon the renewal fund are approved or, in cases of emergency, from other balances as provided for in the agreement.

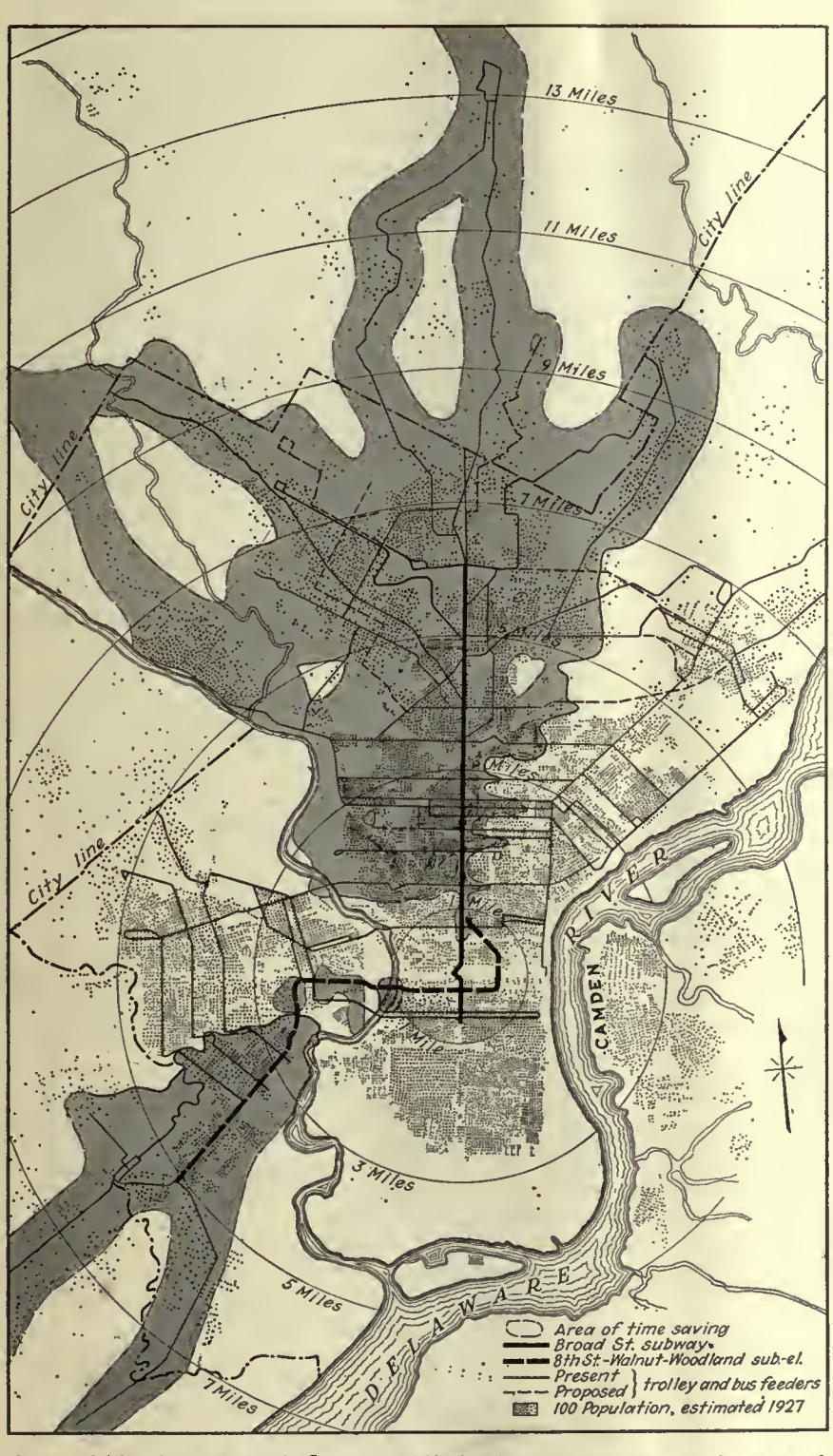
City's Amortization Policy Recognized

Under the law all construction money must be fully amortized by the city within the 15-30-50 year periods of issue, roughly apportioned to the useful life of the property. The sinking fund payments thus add perhaps one-fourth to normal fixed charges of the major part of the structure, the subway. It is evident, states the engineer, that the city is thus following a very conservative financial policy, especially with regard to the permanent subway structure, in writing off the entire investment within 15 to 50 years, as the case may be. This amortization policy has two great advantages:

> 1. It deliberately retires a good portion of the investment covering building for the future which is necessary in any rapid transit enterprise, due to the nature of the task and the high cost of enlarging to four tracks later.
> 2. It creates a "revolving fund" progressively built up from bond retirements out of which new extensions and major replacements may be made without recapitalization, thus providing a financial "cushion" for readjusting future operations to the current needs, and avoid the entire dependence on new bond issues which might not then be economically feasible (such as during war times). Also to a moderate degree it puts the brake on unwise expansion.

Thus in this Philadelphia situation, while the burden of amortization is unescapable, it is eminently conservative and helpful to the next generation, and the plan has been worked out so that the present taxpayer burden under the law is minimum, adequate renewal of the property is practically guaranteed.

Under the conditions, the amassing of a depreciation reserve fund based upon the useful life of the principal parts of the property is not deemed advisable or necessary by the engineer. Instead, actual "renewal liability" has been provided for, based upon such life but with a much lighter burden on fares and with a reserve fund limited to amounts estimated to be needed to carry the system over its peak years of renewal requirements, plus a reasonable safety factor. This principle of renewal liability as distinguished from accrued depreciation was developed by the engineer in the 1925 fare case for the entire P.R.T. system, recognizing that a large part of any accrued depreciation reserve will never be required



Area within time-saving influence, Philadelphia Broad Street subway and Woodland-Walnut subway-elevated

The time-saving area represents the estimated area in which time will be saved by riding to or from the business district on rapid transit lines (local service) and feeders, as compared with routing on existing railway and bus lines.

The estimated population in 1927 is based on the 1920 census revised to 1927 as indicated by the 1927 school census. The population that is shown outside of the city limits is taken from the 1920 census.

as such because the overlapping renewal maturities of the various parts of the property are spread over long periods of years, and only a small portion matures at any one time. The engineer defines renewal liability to mean:

> Such estimated amounts which in the aggregate will suffice to meet the cost of renewals or replacements or both of any and all depreciable elements of the property as and when actually required, but excluding that portion of accrued depreciation which in the aggregate can never mature as such at any one time, that is the full difference between the cost new and the depreciated value of said property as a whole.

Thus under the agreement rates will carry only actual renewal cost. As the amortization of the entire property is mandatory by law, no justification exists for the double amortization which would result from full accrued depreciation. Until the first bonds mature (fifteen years), renewals will be carried out of revenue. Thereafter, renewals will be refunded so far as necessary. Thus the amortized capital will be "plowed back into the property" as fast as used up in service and ultimately the bonded debt will be progressively reduced.

Local Supervision Considered Essential

A co-operative board of control is recommended by the engineer as a practical safeguard to the city's growing interests, i.e., a co-operative agency appropriately representative of both city and company, to decide promptly the multitude of questions, technical and financial, for which this board is especially qualified. This simply puts into practice the spirit of co-operation voiced in the 1907 city-company contract, but which has heretofore proved somewhat unworkable under its terms. This supervision is not a charter function of the Department of City Transit as now constituted.

Under a guaranteed-rental lease requiring return of the property in proper condition the Board of Control would not be so essential. But with the projected city system advancing so rapidly to a position of preponderant investment interest, and the necessity of current knowledge of revenues and operations, maintenance of physical condition and safety funds therefor, and since the city has elected to take the responsibility for rapid transit development, this technical control, continuous and "at the source," is considered an important step in advance in the Philadelphia situation. In the language of the report and agreement, the board members should be:

> Qualified by training and experience in the operation, accounting, engineering and/or finance of transit systems. In no sense assuming managerial functions, but rather to provide a qualified agency thoroughly informed, technically experienced and continuously active in all matters affecting the operation and financial integrity of the city system.

The company appoints one member, the Mayor appoints the chairman; the Director of Transit sits ex officio, thus tying in effectively the city's construction organization.

This step is in line with the established policy of the two largest Pennsylvania cities, viz., The "Gas Commission" of the Philadelphia Gas Works ordinance, and the "Conference Board" of the Pittsburgh traction ordinance. This board will keep currently informed, make official determinations and certifications, approve budgets, appropriations and contracts, and recommend on numerous questions continuously arising, thus relieving the city's legislative and executive authorities of all technical details except such as require city action.

City's Stability and Trend Justify Contingent Plan

Heretofore cities seem to have been satisfied to provide construction money simply on guaranteed carrying charges paid by the lessee. As a result, to safeguard against contingencies the lessee drives as hard a bargain as possible, aided by the ghost of operating deficits of the early years. Inevitably the taxpayer foots the bill. But Philadelphia, with its remarkable history of steady growth and industry, stability and diversification, has itself provided the necessary guarantee of safety. Hence this plan, with a return to the city contingent on traffic and revenue, has been designed to release the lessee from the actual or assumed risk necessarily an important factor in any guaranteed rental. Thus relieved, the lessee becomes simply a licensed operator on stated compensation.

The full perspective, the engineer states, must embrace the fact that Philadelphia has alone taken upon itself the duty heretofore assumed largely by private capital as one of the responsibilities of a supervised monopoly, in developing transit in proportion to the needs of the community. The city has developed its best traffic artery, heretofore undeveloped. North Philadelphia as a whole contains more than half the population of the city, and it is estimated that two-thirds the population of this district, more than 700,000 people, reside within the territory served by the zone of influence of the Broad Street subway and its co-ordinated feeders, i.e., within the time-saving zone. Moreover, outlying North Philadelphia is now and since 1900 has been growing fastest in population of any section of the city. This is particularly true since 1920. Underlying all this, Philadelphia has shown itself to possess perhaps the most stable population growth of any American city. While a slight recession is recently in evidence, it is not unreasonable to assume that Philadelphia's broad underlying growth should continue, especially in a community of such fortunate diversified industry.

The Housing Association's coded spot map of dwellings built in 1923 and 1926 gives striking evidence of the concentration around the Broad Street subway, and beyond, reflecting anticipated subway service, likewise the condensation at the end of the Frankford line to the northeast. Not only row houses but even apartments have made their appearance well beyond the north terminal. Thus the subway will at once fulfill a major purpose—high speed and long haul—and very probably will supplant a considerable portion of private automobile traffic.

The potential service possibilities of the city's new high-speed system are here measured by the time saving over present surface car line and bus schedules to the center of the city. Tributary population within the city limits shown by dots on the time-saving zone of influence map is recorded as of 1927. The unshaded areas to the northeast and to the west are already covered by the Market Street-Frankford elevated route. This time saving is based upon surface line and bus feeder schedule operations, allowing suitable period for transfers. It is this time saving in which the surface lines find their most valuable service rather than in long-haul service to the center. While recapture of private automobile traffic now existing has not been, and cannot be, accurately estimated, the engineer believes that much of this long-haul auto traffic will swing over to the subway as central congestion increases.

Benefit Assessment Recommended

The lines here represented are estimated to cost around $89,000,000 complete for the first unit, City Hall North, $120,000,000 including the South and Ridge-Eighth Street extension, and branch, and around $160,000,000 when the Walnut-Woodland subway extension to Darby is completed. Other projected extensions further south, to the northwest and branches to the north will require still other capital in large amounts. The engineer therefore raises the question whether the time has not come for the principle of local benefit assessment to be incorporated in the city's transit financing, pointing out that a joint resolution therefor has already passed two legislatures and awaits referendum for the construction of Pittsburgh systems.

In an economic sense, it is paid-up amortization of the extra development cost of building for the future as well as for the present by contributions from property benefited by the improvement, in proportion to such benefit. By this means the additional burden of fares and taxes from such expensive form of transit construction will be proportionately reduced and the release of city's borrowing power facilitated to maintain the continued growth to which the city is entitled.

Enabling legislation for Philadelphia to provide the necessary legal machinery and safeguard its administration is suggested.

The engineer's report discusses also the various alternative plans of the contract-lease ranging between: (a) A fixed guaranteed rental, and (b) complete independent operation by the city or other operator with city feeders, including compromise independent operations with feeder service, as agreed upon; contingent rental based upon a fraction of the fare; sliding scale guaranteed rental following the net earnings, etc. But while independent operation exists as a possibility and last resort, the engineer strongly recommends the fully co-ordinated plan with uniform fares, exchanges and interline free transfers to feeder lines. In this matter the system will be most completely integrated, the public given the best service and both city and company derive larger revenues than if independent operations were resorted to.

In the final perspective, the proposed operating agreement gives the car rider a uniform 7½-8-cent fare and universal transfers and at the start pays about one-half of the carrying charges, while the taxpayer carries the other half, the company's responsibility for city lines is confined to efficient operation and receives one-half of the interline riding revenue, the city receives what is probably the maximum return under any practical form of lease and saves the public from 1.5 to 2 per cent on the cost of financing. The P.R.T. is permitted to merge into its system a new system of modern high-speed trunk lines, and continue its operations under the 1907 agreement at much less cost than if it had been called upon to build these high-speed lines itself.

A proposed agreement and operating contract is appended to the report and gives in detail the features stated by the engineer as essential in securing the results desired. This was prepared after consultation with the city officials concerned.



These cars for the electrically equipped Stadtbahn in Berlin have four double sliding doors on each side

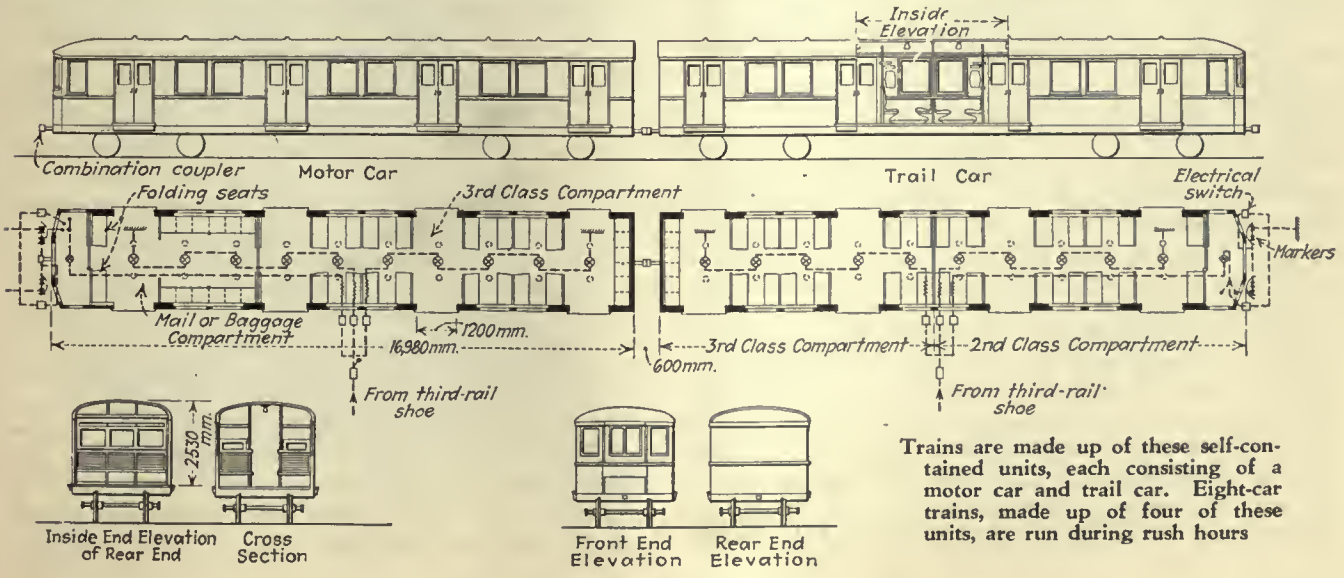
Cars on Berlin Stadtbahn

The design of the cars selected for this rapid transit road, now being electrically equipped, is given in detail. The electrical equipment includes a number of novel features

By Henry W. Blake
Senior Editor ELECTRIC RAILWAY JOURNAL

DESIGN of the car adopted for the Berlin Stadtbahn is of equal interest with the power distribution system with which the same road is equipped. An account of the latter was published in the issue of this paper for Nov. 5. Before making a selection of the type of car the engineers of the German State Railways, the owner of the line, made an extended study of the types used in rapid-transit service. Particular attention was given to the determination of the most desirable arrangement of seats and doors. To help in the decision several experimental cars were built. The results obtained from these samples led to the selection of the present design.

The chief points sought in the new cars were: Largest carrying capacity, especially for rush-hour conditions, within the clearance limits available; rapid rate



Trains are made up of these self-contained units, each consisting of a motor car and trail car. Eight-car trains, made up of four of these units, are run during rush hours

of passenger interchange to reduce the length of station stops; easy subdivision of the train, so that its length could be varied according to the traffic demand; short distance between station platform and car floor.

Cars are now being built according to the final design by a number of different car builders. The halftone engraving at the beginning of this article shows the exterior of one of the cars built by the Waggon & Maschinenbau A. G. of Görlitz. The accompanying line drawing shows a motor car and trailer being built by the Orenstein & Koppel Company of Berlin. These two cars are of the same length, and in operation a motor and trailer are permanently connected together to form a two-car train. Such a train can be run by itself, or in combination with other similar groups of two cars to make a four-car, six-car or eight-car train.

The eight-car train would consist of four motor cars and four trailers and would have a total length of 140 m. (460 ft.). This is the longest train that can be accommodated at the present station platforms.

As will be seen from the plan, the outer or free end of the motor car has a motorman's compartment extending the entire width of the car. Directly to the rear of this compartment is a section about 4.7 m. (15 ft. 5 in.) in length, separated from the rest of the car by a sliding door. This section has two double cross seats and four double longitudinal seats, all of which can be raised, so that mail and baggage can be carried in this section, if necessary. At the rear of this section is another with cross seats for 38 third-class passengers. All the seats in the trail car are transverse, but the car is divided by a bulkhead into two compartments, one for third-class and one for second-class passengers. In each complete "quarter train" there are upholstered seats for 28 second-class passengers and slat seats for 84 third-class passengers. Besides these seats there is a large amount of room for standing passengers.

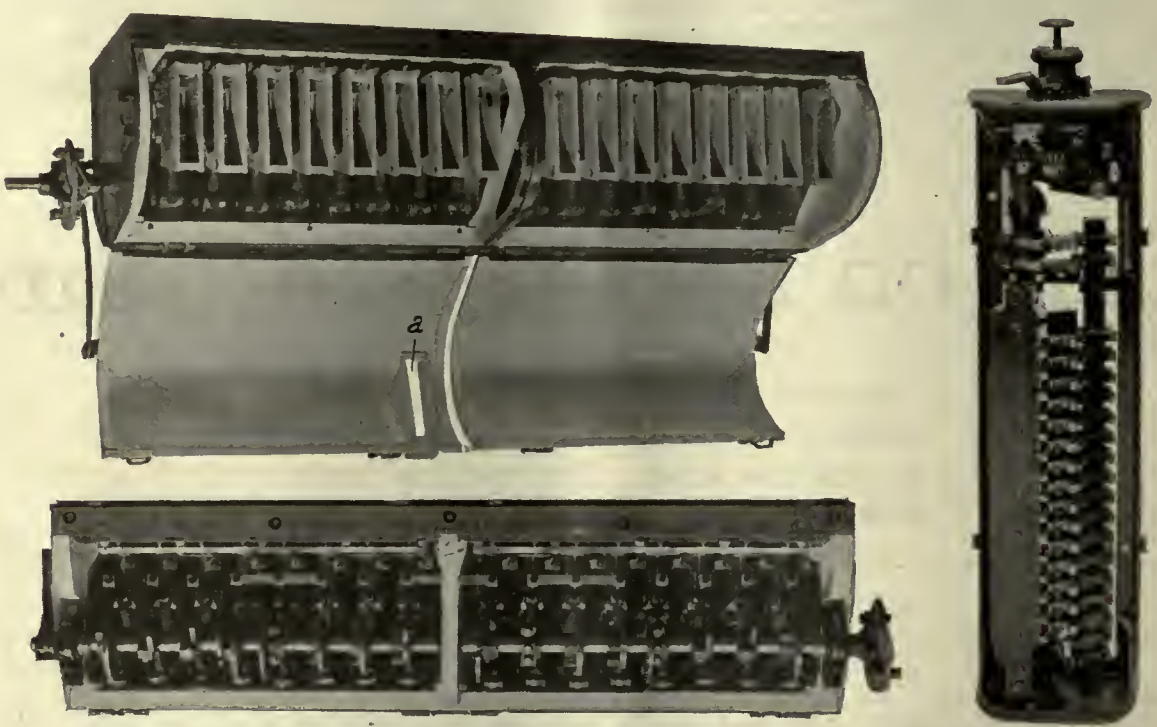
As is common on local lines in Germany there are no so-called first-class compartments. Tickets are sold only for second and third-class accommodations.

The weight of the car bodies has been kept low by the use of silicon steel and simplification of design, so that an entire train of eight cars weighs about 248 metric tons (545,600 lb.). Still further reduction in weight is hoped for following the use of aluminum alloy. Such a train would carry in rush hours an average load of about 1,000 persons, making the weight of train with load about 320 metric tons (704,000 lb.).

On each side of each car are four double sliding doors, each 1,200 mm. (47¼ in.) wide. The large side windows are counterbalanced and they can be opened for one-half of their height. The flooring is covered with fireproof cement. Electric lighting is provided in each car by three circuits of five lamps in dome fixtures, which give a good light distribution without a dazzling effect. Each car is equipped with fifteen electric heaters, wound for 750 volts and 750 watts, and arranged under the seats. In each motorman's cab is a fire extinguisher and a Krupp typhone signal whistle.

The couplings are of the automatic combination type and provide for air connections. Later the electrical connections will probably be included in the couplers. The trucks have a wheelbase of 2,500 mm. (8 ft. 2½ in.) with wheels of 900 mm. (35½ in.) diameter. Air brakes of the variable-load type are used. The management says that it plans to use brake shoes of wood or similar material to avoid generation on the road of iron dust which may get into the motors.

Considerable study was given to the question of equipment. In the early tests each motor car was equipped



At left, two views of the car controller from opposite sides. At right, master controller

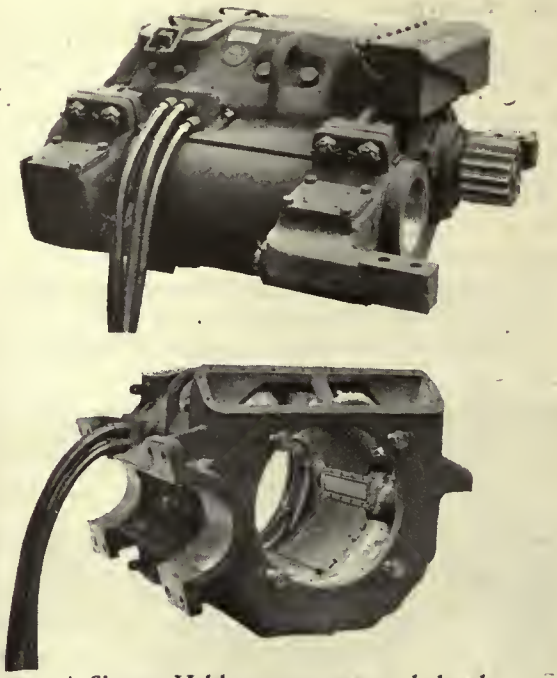
In the car controller "a" indicates an opening under the load switch.

In the master controller the starting knob on top is arranged like a deadman's handle. The small lever below is a selective switch for varying the rate of acceleration and for changing from forward to backward operation.

with two 750-volt motors, each having a capacity of 170 kw. at 630 r.p.m. on the hourly rating. These motors weighed about 3 metric tons each and both were mounted on the outer truck of the motor car. Later, this type of equipment was abandoned for a four-motor equipment for each motor car, each motor being wound for 375 volts, the two on each truck being connected permanently in series. Each of these motors at 800 r.p.m. has a rating of 90 kw. on the hourly basis and of about 56 kw. on the continuous basis and weighs with casings 1.66 metric tons (3,660 lb.). The decision in favor of four instead of two motors per motor car was because they provide greater tractive effort and permit the use of smaller diameter wheels (1,000 mm., or 39.4 in., in the original design and 900 mm., or 35½ in., in the latest cars). Smaller wheels, in turn, permitted somewhat more freedom in body design. The lower voltage was adopted because it was expected to simplify the design of the motors and lessen their maintenance. While it reduces somewhat the number of economical running positions, those possible with 375-volt motors are considered sufficient.

The motors are mounted by nose suspension and are connected to the axles through gearing having a reduction of 67 to 17.

The motor order was divided among the A.E.G. Brown-Boveri and Siemens-Schuckert. One of the views shows a motor of the Siemens-Schuckert Company with and without armature. In this view the straight line suspension of the gear case by brackets from the motor frame will be noticed, as will also the method of inclosing the axle between bearings. Another view shows a ventilated armature of the A.E.G. make. Its most striking feature, to an American, is the attachment of the fan at the commutator end of the armature shaft



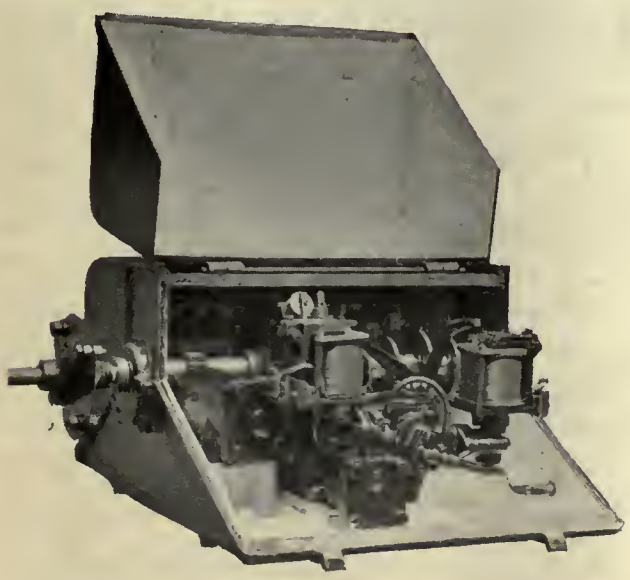
A Siemens-Halske motor, open and closed



Armature for an A.E.G. ventilated railway motor. Note the fan is at the commutator end of the shaft



Roller bearings are used for armatures



Electro-pneumatic mechanism for operating car controller

instead of at the pinion end. All armatures have roller bearings. The efficiency of the motors including gearing is 88 per cent.

Electro-pneumatic control is used. The two groups of motors are connected in series and in parallel by the bridging method. The car controller (illustrated in one of the views) performs the function of the switch group used in corresponding control equipment in the United States. In this controller the contacts are closed and opened by the movements of rollers bearing against eccentrically shaped disks, similar to the cam controller used in the United States. For safety, the circuit is kept closed also by the action of the roller on the disk. The contact is opened by a spring. Each contact has its own magnetic blowout. The one under the opening marked *a* in the controller view is a so-called load switch, which provides the necessary bridging connection for changing from series to parallel.

The shaft of the car controller is rotated by the action on a ratchet wheel of a pawl pneumatically operated and electrically controlled. The mechanism at the end of the controller shaft for doing this is shown in an accompanying view, though the ratchet wheel is hidden behind the rest of the mechanism.

The entire train control is automatic. The motorman starts the train by pressing down the button of the master controller, shown on the opposite page. Further notching up from point to point follows automatically in the switch relays when the motor current has fallen

to the predetermined value. The current taken at starting is always the same, so that overloading of the motors is not possible. The two motors connected permanently in series pick up current in the same way as if they were connected in parallel. For example, if an average acceleration of 0.5 m. per second per second (1.12 m.p.h.p.s.) is required, the acceleration in the series position would be 0.8 m. per second per second (1.78 m.p.h.p.s.) and 0.36 m. per second per second (0.8 m.p.h.p.s.) in the parallel position.

If the motorman should take his hand off the knob, or a deadman's handle, all power is cut off the train. With the so-called selective switch, shown in the view of the



Dome lighting is used and the seats in the second-class compartments are upholstered

master controller, the motorman can determine the average starting acceleration. For example, he can select 0.67 m.p.h.p.s. in suburban operation and 1.12 m.p.h.p.s. in the city. This same switch can also be used for changing from forward to backward movement.

Further apparatus in the control equipment includes the following: (1) A direction reverser with two compressed air cylinders and magnetic control, (2) a no-voltage protective relay, whose magnet coil is directly connected to the main circuit from the third rail shoe, shuts off all control apparatus from the car if the current collector loses voltage, (3) a series overload relay for the motor circuit which operates when the motor current reaches too great an amount, and (4) a switch by which it is possible to cut out a single car. The controller has special contacts for the heating circuit and the circuit for the compressor motors.

While the Stadtbahn is being electrically equipped, the opportunity is being taken to install some other apparatus whose use will be extended to all sections as rapidly as possible even while steam locomotives are being used. One of these is an automatic signal system which is being put in by the Siemens-Halske Company. The cables for this system are being laid at the side of the track in a trough which is covered with asphalt and can then be used for a walk-way. An automatic stop will be used in connection with the signal system.

The platforms at all stations are being raised to the height of the car floors.

An electrical repair shop is under construction. Associated with it will be housing accommodations for the employees.

Increased Capacity Will Follow Electrical Equipment

The maximum number of trains which can be run on the Stadtbahn at present with the existing steam service is 24 per hour. These trains have a carrying capacity for passengers seated and standing of about 27,200. On the Ringbahn, on account of the limitations of the stations, the capacity with steam power is only about twelve trains an hour, representing about 12,400 seating and standing passengers.

Electrical operation on the Stadtbahn means an increase from 24 to 40 trains per hour, or 67 per cent, and on the Ringbahn from twelve to 24 trains, or 100 per cent. Moreover, the electrically equipped trains on the Stadtbahn will carry 40 per cent and on the Ringbahn 55 per cent more passengers, so that the net result on the former is to make its capacity 2.34 times and on the latter make three times the present steam service. The running time will be improved by about 25 per cent. On the suburban sections a corresponding gain is secured.

Formerly, the only way of reducing total train capacity in the hours of light traffic was by increasing the headway. Now it is possible to meet this condition by decreasing the length of the trains, so that the headway used need not be lengthened. This means better service. A saving in man-power for operating the trains is also expected.

The only question which remains to be considered is that of the way of handling the through steam trains which will still use part of the Stadtbahn to reach their terminals or to pass through the city. The present plan is to haul these trains by electric locomotives, and a sample locomotive is being built for this purpose at the Siemens-Schuckert works.

Detroit Accident Record Improving

FURTHER decrease in accidents is seen on the lines of the Detroit Department of Street Railways for the month of October, 1927, as contrasted with the corresponding month of 1926, according to Del A. Smith, general manager of the property. The reduction is from 1,624 to 1,084 for the system, or 33.2 per cent. This he attributes to the low labor turnover, which at the present time is less than 0.5 per cent. The accompanying tabulation gives the comparison for the various divisions.

COMPARATIVE ACCIDENT RECORDS 1927–1926, DETROIT DEPARTMENT OF STREET RAILWAYS

Division	Total 1927	Accidents 1926	Per Cent Decrease
Trumbull	48	112	57.1
Woodward	89	154	42.2
Baker	90	147	38.8
Shoemaker	115	187	38.5
Fort	128	206	37.9
Gratiot	157	240	34.6
*East Coach	53	76	30.3
Fourteenth	164	233	29.6
Jefferson	123	163	24.5
*West Coach	117	106	†10.4
Total	1,084	1,624	33.2

*Coach record for October, 1927, compared with September, 1927.
†Indicates increase.

Rapid Transit Railways

Now Serve Sydney, Australia



The six-track main line passing Central Station will cross this viaduct

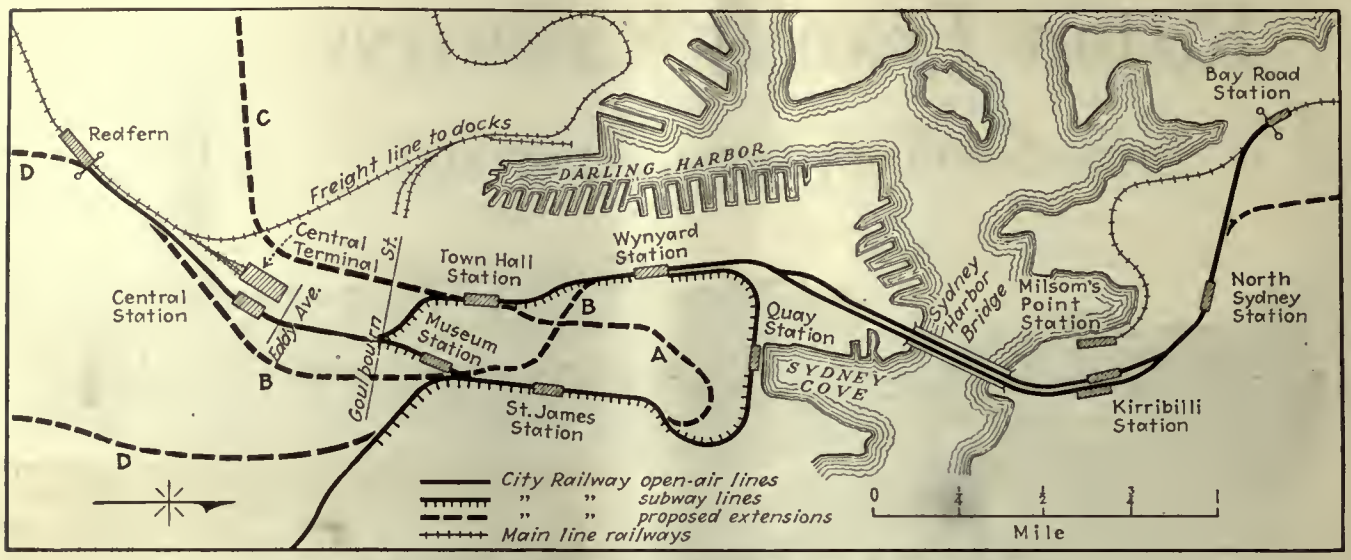
SYDNEY, New South Wales, Australia, will have one of the most complete rapid transit electric railway systems in the world when lines under construction and proposed extensions are completed, according to an article in *Engineering News-Record*. The system, the first part of which was opened in December, 1926, will include underground lines in the business district and surface lines connecting with the suburban railways. The lines will extend across the great 1,650-ft. cantilever bridge now being built over the harbor, to connect with lines in North Sydney. Part of the line, that passing the Central Terminal Station, is to be elevated. The viaduct which will carry this six-track main line is shown in the illustration on this page.

From the four-track main line railway entering Sydney from the south suburban traffic will be diverted at Redfern by the eight-track city railway, paralleling the former as far as the Central Terminal Station, as shown on the map. Beyond the Central local station six tracks go underground to the Wynyard station, whence four high-level tracks will extend across the new bridge, while the two low-level tracks loop around the business district and return to the Central local station. Proposed extensions include: (1) An inner loop, *A*, serving an eastern suburban line; (2) a second connection, *B-B*, between Wynyard and Redfern for bridge trains, and (3) western and southern suburban extensions *C* and *D*. In North Sydney the line will connect with the existing railway now isolated, while additional lines in that section are planned.

From Redfern the round-trip route by the city loop is 5.5 miles, with 18 miles of track. From the Central station the round trip of 3.6 miles is to be made in 11½ minutes. On the portion now in operation, Central to St. James, the run is made in 2½ minutes, which is said to be about the time otherwise required to leave the train at the Central Terminal and board a downtown street car. The longest distance between stations will be less than a mile.

Many features enter into the construction and arrangement of the crossings, underground lines, tracks and stations of the system. Among these are the numerous "flyover" crossings which separate the grades at the track intersections. A special layout of this kind is required in the south approach to the Central local station, since the arrangement of eight tracks for northbound and southbound trains alternately is here changed to alternate pairs, so that each of the four island platforms is served by trains in one direction only. As these tracks are assigned to specific routes, the connections and grades are complicated; in fact, this is said to be the largest crossing of the kind in the world, having fourteen flyovers separated by two crossings at grade, but used only by trains in the same direction. Part of this crossing is shown in one of the illustrations, with high-level tracks on each side of the roadbed for depressed track.

On the underground portions of the route twin single-track tunnels are driven for the different double-track lines. At the Goulbourn Street portal there are six tun-



Map showing the present and proposed rapid-transit lines of Sydney, Australia

nels. The two on the north are for tracks to the harbor bridge, while the two in the middle and two at the south are for the west and east sides, respectively, of the city loop.

Stone-ballasted track having 40-ft., 80-lb. T-rails laid to break joints is standard. Ties are of ironbark, 9x5 in. and 8 ft. long, spaced eighteen to a rail length, with the shoulder ties carrying bridge plates 30 in. long to support the joints. Steel tie plates give the rails an inward cant of 1 in 20. To prevent leakage of current, insulating pads are placed between the tie plates and the rails. In the underground stations, however, the ties are embedded in a concrete floor, the surface of which is kept 1 in. below base of rail at center of tie and then sloped to the drains. For the overhead wiring on open track steel bridges carry catenary cables from which are suspended the trolley wires of cadmium bronze.

With the city or rapid transit railway completed and the suburban lines electrified, all suburban traffic now entering the Central Terminal Station will pass through the new Central elevated station. It has eight tracks served by four island platforms 520 ft. long, with a maximum width of 33 ft. Platform shelters have concrete slab roofs on pairs of steel columns 12 ft. apart and spaced 38 ft. longitudinally. At each end of each platform are two stairways, for entrance and exit, connecting with subway concourses. These stairways are 7½ ft. wide and have a total rise of 19½ ft. Each platform has also a 3-ton electric baggage elevator, connecting with a 10-ft. subway leading into the baggage room of the adjacent terminal station.

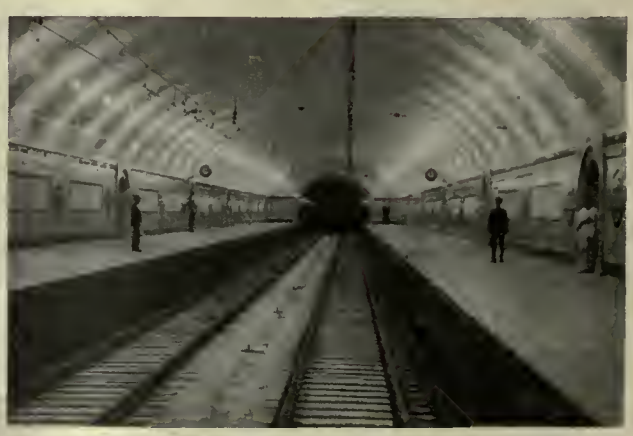


One of the several "flyover" crossings of the system

Underground stations are of different types. St. James station, 40 ft. below the surface, has two island platforms. City or local trains use the outer tracks while the middle tracks are for trains of the eastern suburban line, which diverges south of



Central Station, where eight tracks and four island platforms are employed



Museum station of the Sydney City Railway. Brilliant lighting is a feature

the station as shown on the map on page 986. This station is 108 ft. wide, with 28-ft. platforms 520 ft. long. Each platform has one 12-ft. stairway for descending passengers and two 6-ft. stairways for ascending passengers. These stairways open from a concourse 108 ft. square 16½ ft. above the platform and 16 to 18 ft. high, having subway ramps to the streets. The Museum station, for two tracks, is 48 ft. wide with an arched roof over the tracks and two 12½-ft. side platforms. Here the rails are about 45 ft. below the surface. Long inclined subways or ramps, with steps at intervals, connect with the streets. Interior walls are lined to a height of 8 ft. with cream colored glazed tile having moldings of different colors. Above this the concrete is given a hard, dense surface by spraying it with two coats of mill-white water paint. All stairways have 12-in. treads and 6-in. risers and the maximum height for any flight is 8½ ft. Illumination in the underground stations has an intensity of 4 foot-candles on a plane 3 ft. above the platform. As a result of this brilliant lighting favorable contracts have been let for the advertising spaces on the walls. Two circuits provide against entire failure of the lights. The illustration of this station shows the excellent lighting.

The railway was designed and built under the direction of J. J. C. Bradfield, chief engineer of the Metropolitan Railway and Sydney Harbor Bridge. R. J. Boyd is principal designing engineer, W. Farrow supervisor of construction, K. A. Fraser and A. Humphries resident engineers and M. Myers chief electrical engineer.

Promoters of Beautiful Stations Win Awards

FALL inspection of stations of the Illinois Power & Light Company, Chicago, Ill., for the award of 1927 prizes to winners in the station beautification and neatness contest has been completed by the committee appointed by D. W. Snyder, Jr., vice-president.

On the main line the winners are as follows:

Southern division—Gillespie, first; Anderson substation, second; Virden substation, third. Central division—Forsyth, first; Bondville, second; Harristown, third. Eastern division—Fithian, first; Homer, second; Ridge Farm, third. Northern division—Mindale, first; Union, second; Morton, third. On the Illinois Valley division the winners were as follows; Ottawa shops, first; Minooka, second; Seneca, third.

As a reward for appearance of the several stations, prizes were allotted to the winners in each division to the amount of $35 for first, $25 for second and $15 for third.

Because of the excellence of the winners of first place in all four divisions of the main line the grand prize of $65 offered for the best developed station and grounds was divided between the four winners—Gillespie, Forsyth, Fithian and Mindale.

Many of these stations were so carefully cared for that they were indeed beauty spots along the Illinois Traction System lines. The care, time and work given to the beautification effort by the station and substation attendants were responsible for the results attained. Throughout the territory adverse weather conditions made the work of growing flowers, shrubs and grass exceedingly difficult, but those in charge of stations succeeded in spite of these handicaps.

In addition to the prize winners there were many other stations and grounds that showed the result of work and care.

Numbered Route Signs Used in Milwaukee

NUMBERING of street car routes, and providing illuminated numbered signs on its cars, is an innovation being carried out by the Milwaukee Electric Railway & Light Company. The numerals are 8 in. high, and are placed in boxes which are 15 in. square. They occupy a position on the front left-hand top of the car roof, which will demand attention. Beneath the number, on the same sign, appears the name of the route in



Car of the Milwaukee Electric Railway & Light Company with new sign arrangement

smaller lettering. The entire sign is illuminated at night, so that the numerals can be read easily.

The oblong illuminated roller sign on the cars will be used to indicate destination only. In addition, colored illuminated boarding signs, similar to those used on one-man safety cars, will be placed on all types of equipment.

Single-end rear-entrance cars will bear the message "Rear Entrance" on blue glass. Double-end cars will carry the sign "Enter at the Front or Center" on amber glass, and signs for the center-entrance type cars will read "Center Entrance" on red glass. On one-man cars a "Front Entrance" sign will appear on green glass.

It is expected that riders will memorize the route numbers and refer to them rather than to the route name. As the numbers are of large size, greater visibility of the numerals will tend to facilitate operation, particularly at night, on streets where more than one line passes. Motor buses operated by the company will have similar route signs, and a city and suburban transportation map showing all the lines with their route numbers will be distributed to the public.

Valuation of Louisville Railway Has Novel Features

Report on cost of reproduction of the Louisville Railway recently made by the Beeler Organization uses latest Supreme Court decision as basis. Perpetual inventory method is recommended

SEVERAL points of interest are raised in the valuation of the Louisville Railway which recently was presented to Mayor Joseph T. O'Neal and the Board of Public Works of the city of Louisville. The report was prepared by the Beeler Organization of New York under the supervision of John A. Beeler, director, and Harold H. Dunn, associate engineer. Chief among the points covered are the method of determining depreciation, the determination of overheads and the continuous inventory system recommended.

The total valuation of the property, as given in Table I, was $28,393,734, which represents the reproduction cost new as of Dec. 31, 1926. From this is subtracted depreciation amounting to $3,944,952, leaving a net "sound value" of $24,448,782.

In addition to this property which is used and useful in railway operation, the engineer gave detailed reproduction costs on property not used and useful, totaling $1,138,714, from which depreciation of $498,125 was deducted, leaving a sound value of $640,589. These values were all determined, states the engineer, by taking an actual inventory of the property, appraising the used and useful property on a cost-to-reproduce basis, analyzing and establishing in detail units of value for each inventory item, showing the cost of labor, materials and equipment as of Dec. 31, 1926.

In pricing the physical property as determined by the inventory, attention was given to the method of construction. On this point the engineer makes the following statement:

> Construction cost is dependent in a considerable measure on the construction program. In our judgment the greatest economy in the construction of this plant would be attained in a program extending over a period of two years, except as regards the Campbell Street power plant. As a source of power during peak load and as a reserve plant, this unit would not be needed as soon as the High Street plant, which cares for the normal loads. The construction of the reserve plant, therefore, could be started somewhat later than High Street, and it should be completed within the six months following completion of the remainder of the railway property.
>
> Power plants, substations, carhouses, miscellaneous buildings and underground conduits could, without doubt, be built more expeditiously and economically under contract, for the railway would not care to perpetuate organizations brought together for this purpose, nor would it continue to have need for such construction equipment. The remainder of the property with the possible exception of grading and paving could be constructed advantageously by railway company organizations.
>
> Under either plan of construction, however, there would be incidental expenses in addition to the bare cost of materials and labor. Such incidental expenses include construction office expense, including time keeping, cost keeping, watching and guarding, the cost of storage sheds, scaffolding, temporary piping and wiring, temporary tracks and equipment, the wear and tear on construction machinery, delays, loss and waste in construction, inspection and testing locally and at manufacturers' plants to make sure that specifications and guarantees are being satisfied, the expense of preparing plant units for operation and adapting them to operating conditions, and contractors' bonds and liability insurance. These and kindred expenses would be covered in a contractors' bid or estimate, and they would be just as real and necessary a part of the cost of construction of the plant as if it was built by the company's own construction organization. In addition, a contractor would add a certain amount as his profit, but in close bidding this would be reduced to a minimum.
>
> Certain of the unit prices, therefore, which have been used are such prices as would reasonably be named by a competent contractor if he were seeking the contract in competition with others. In other cases where the unit prices represent the bare cost of material and labor, certain allowances have been made to cover the miscellaneous construction expenses defined above. The following per cent allowances on material and labor, which in our judgment are reasonable, have been made and are distributed through the appraisal of certain classes of construction.
>
> *Buildings*—15 per cent, including architects' fees plus 2 per cent for liability insurance.
>
> *Power plant and substation equipment*—5 per cent.
>
> *Rolling stock*—an item of general expense has been included in the unit cost to cover inspection, a small amount of engineering, preparation for service and adaptation to operating conditions.
>
> *Land*—none.
>
> *Shop, roadway, office and miscellaneous equipment*—none.
>
> *All other construction accounts*—10 per cent.

Depreciation Considered in Detail

Careful consideration of the depreciation of the property was given in order to arrive at the present sound value. The courts consistently hold, states the engineer, that it is the duty of a public utility company to maintain its property through repair, maintenance and renewal of parts so that as one composite instrument of service it will remain in the maximum economic condition and so that the integrity of the investment shall be maintained. It is held that if this duty is fully performed, the property as a whole has not depreciated, but that depreciation has taken place and should be deducted in such measure as this duty has not been fulfilled. On the other hand, it is inevitable that any property which has been operating throughout a long period of years will include many units which have ceased to perform the functions they were originally built for, or perform some less efficiently.

While the courts recognize the necessity of accumulating a reserve on the basis of depreciation calculations, or, more properly speaking, retirement calculations founded on age and life data, they do not regard this amount as properly deductible from reproduction cost in the determination of the present fair value of a public utility property. Even a property in 100 per cent operating condition would undoubtedly show evidences of depreciation as measured by its remaining years of usefulness. The test used by the courts is to determine in what measure the property has not been maintained to the maximum standard or is incapable of rendering maximum service.

*Card No.*_____ *Account No.*_____
*Article*_____
*Location*_____
*Installed*_____ *Auth. No.*_____
*Depreciation Rate*_____ *Cost in Place*_____
*Description*_____

Type of small unit card recommended for first system of perpetual inventory

With these considerations in mind, the engineer made estimates of loss of value, which have been summarized by I.C.C. accounts, and the reproduction cost new less depreciation was calculated therefrom. These summarized accounts are also given in Table I.

Determination of Overheads

In general the overheads are determined in the manner ordinarily used in making valuations of public utility properties. The principal concern in matters along this line is the determination of going concern value. This determination, states the engineer, is based on the decision handed down on Nov. 22, 1926, by the United States Supreme Court in the McCardle, et al. vs. Indianapolis Water Company, which is:

> The decision of this court declares: "That there is an element of value in an assembled and established plant, doing business and earning money, over one not thus advanced, is self-evident. This element of value is a property right, and should be considered in determining the value of the property, upon which the owner has a right to take a fair return when the same is privately owned although dedicated to public use."

It is pointed out that a great deal of the prosperity of the city of Louisville is due to the Louisville Railway. Public transportation is a prime necessity in all live communities, and the Louisville Railway's 184 miles of track, serving practically every section of the city, have been built up from a modest beginning by extension into hitherto undeveloped or partially developed sections. The process of building the lines up beyond the central confines and making possible the distribution of the population over the 40 square miles now under service has been accomplished slowly and at considerable expense. The company has also created out of a number of more or less loosely organized street car lines one unified and comprehensive system with the supersession of property incident thereto, and it has built up a trained and skilled personnel and accumulated records enabling it to operate more efficiently.

The cost of this development from a mere physical property to a going concern with an established routine and an attached business represents an element of intangible value termed "going concern value." Whereas this historical development has required many years, the development of this great producing property from the collection of physical property units described in the inventory to a going concern with a trained personnel, accumulated records and operating routine and an established business would require a relatively short period and would not be determined on the basis of its historical development cost. After a careful study of this system and the conditions surrounding its operation, states the engineer, the foregoing cost is estimated to be $1,775,000, which in his opinion represents the going concern value of this property on the reproduction cost basis.

Continuous Inventory System

Besides making the inventory, the engineer prepared a plan for a continuous inventory and appraisal of the property so that the valuation may be kept up to date. The first requisite for such a system, it is stated, is an inventory and appraisal worthy of perpetuation and in such form that it can be set up in a manner permitting its continuance. This basic appraisal may be set up in any one of three forms—a loose-leaf book system, a vertical card system, or a visible card system. In the latter the cards are filed horizontally in drawers, all the cards in each drawer being visible at a glance. It has certain advantages over the other systems, but any of the three serve the purpose admirably.

Two types of cards will be required, the unit card covering individual property units, such as a generator, a pump or an automobile, and the multiple-unit card covering such groups of property units as rails, ties, poles, wire and pipe. If a vertical system employing small cards is used, the unit card may be about as shown in the illustration. Additions and retirements may be recorded on the back of the card, which may be ruled so as to provide columns for a description of the work, the authorization number and date of completion, and the cost of each addition with the total cost up to the last date.

If the larger visible index card or loose-leaf book system is used, a form similar to the one shown for the purpose may be used. It will be noted that this card covers both basic appraisal and additions or retirements on its face. Facing this may be another card or page covering depreciation and showing the progress of the property item toward retirement.

The multiple unit cards and the visible index system may be of the same form as described above and the face of the cards in the vertical index system may also be the same as the unit cards. The back of the vertical

*Card No.*_____ *Item*_____ *Account No.*_____
*Location*_____

Line	Auth. No.	Date of Compl'n	Description	Type & Size	Quantity	Unit	Cost this Item in Place Unit Cost	Cost this Item in Place Total Cost	Total Cost to Date	Acct. No.
1										
11										
12										

Card form recommended for perpetual inventory by visible system or loose-leaf book system

TABLE I—REPRODUCTION COST NEW AND OBSERVED DEPRECIATION PROPERTY USED AND USEFUL IN RAILWAY OPERATION, LOUISVILLE RAILWAY
As of Dec. 31, 1926

Acct. No.	Item	Reproduction Cost, New	Depreciation	Sound Value
501	Engineering and superintendence	$748,875	$57,697	$691,178
502	Right-of-way	94,683	.....	94,683
503	Other land used	704,410	.....	704,410
504	Grading	376,923	30,547	346,376
505	Ballast	1,320,281	106,057	1,214,224
506	Ties	665,617	118,811	546,806
507	Rails, rail fastenings and joints	2,183,174	261,980	1,921,194
508	Special work	939,773	169,159	770,614
510	Track and roadway labor	1,870,880	172,596	1,698,284
511	Paving	1,219,898	129,287	1,090,611
512	Roadway machinery and tools	55,625	13,906	41,719
515	Bridges, trestles and culverts	26,199	1,310	24,889
516	Crossings, fences and signs	107,736	21,547	86,189
517	Signals and interlocking apparatus	9,546	477	9,069
518	Telephone and telegraph lines	3,218	804	2,414
519	Poles and fixtures	204,775	40,955	163,820
520	Underground conduit	466,523	.....	466,523
521	Distribution system	722,232	57,780	664,452
523	Shops and carhouses	1,386,754	137,034	1,249,720
524	Stations, miscellaneous buildings and structures	135,371	25,459	109,912
530	Passenger and combination cars	2,861,690	943,523	1,918,167
532	Service equipment	204,210	77,334	126,876
533	Electrical equipment of cars	1,749,540	260,963	1,488,577
536	Shop equipment	142,550	35,637	106,913
537	Furniture and fixtures	48,293	7,244	41,049
538	Miscellaneous equipment	72,950	16,522	56,428
539	Power plant buildings	1,834,934	425,459	1,409,475
540	Substation buildings	85,730	8,573	77,157
542	Power plant equipmeot	2,486,349	771,975	1,714,374
543	Substation equipment	235,447	23,544	211,903
544	Transmission system	263,855	28,772	235,083
545	Franchises	24,425	.....	24,425
546	Law expenditures	112,396	.....	112,396
547	Interest during construction	1,723,765	.....	1,723,765
548	Injuries and damages	268,362	.....	268,362
549	Taxes	198,600	.....	198,600
550	Miscellaneous	418,105	.....	418,105
411	Materials and supplies	375,290	.....	375,290
	Working capital	269,750	.....	269,750
	Total	$26,618,734	$3,944,952	$22,673,782
	Going concern value	1,775,000	.....	1,775,000
	Grand total	$28,393,734	$3,944,952	$24,448,782

cards, however, should be modified by substituting for "description of work" the heading "number of articles—this item and total to date." A summary card for each account may also be included in the system. This will permit of quickly summing up the total property value.

This work should be carried out by a valuation department in charge of a valuation engineer. In order to keep the appraisal up to date, this department must be fully informed of all changes in the property not only as they occur but as each change is authorized. Such an estimate on a suitable form showing a description of the work and estimated total cost with the amount chargeable to property retired, the amount chargeable to operating account and the net addition to capital account should accompany or be made a part of the authorization form.

After approval of the request for authority by the designated official, the completed authorization form or a separate work order form should be sent to the accounting department, the valuation department and the department charged with responsibility for executing the work. During the progress of the work, the purchases, payroll, storehouse and other charges against the particular authorization number will be accumulating in the accounting department, and on completion of the work a complete record of cost will be available there. A summary of quantities and costs may then be made by the valuation department and from this summary the inventory and appraisal cards may be brought up to date.

Renewal of such property items as occasional poles, trolley and transmission wire, hangers, and rails chargeable to operating expense present somewhat greater difficulty. Such equipment, materials and supplies are charged out of the storerooms and yards and installed under the direction of a foreman, whose daily reports together with storeroom records can be made to show the nature, location and cost of such changes. The routine for apprising the valuation department of such changes can best be worked out by consultation between the valuation engineer and the various department heads. The installation of such a system serves not only to keep the description of the utility's property up to date, but furnishes a valuable check on the use of materials.

Signs That Promote Safety in El Paso, Tex.

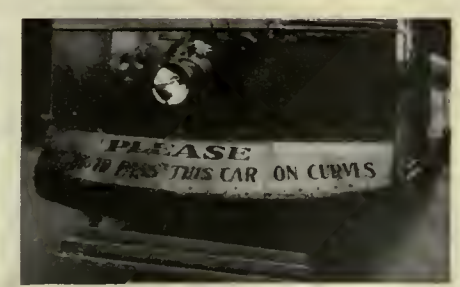
FOUR of the signs which it has found particularly effective in promoting safety are reproduced by the El Paso Electric Company in its brief for the 1927 Coffin Prize. The first illustrated is placed at every dangerous street intersection in the system and about 100 ft. from the car track. It bears the warning "Slow Down—Car Line" in bold letters. As a warning to automobilists it has proved effective.

The second view shows the way in which the back panels of platform folding doors are marked with the word "stop." This word is on a metal sign which is exposed to view when the door is open to permit passengers to board and leave the car. The third sign is that carried above the bumper on a number of double-truck cars that have a wider swing at curves than the single-truck Birneys used on the same routes. The sign reads, "Please do not try to pass this car on curves."

The fourth sign, "Watch Your Step," is used on all street cars and buses in El Paso. It is the same as that on Pullman cars and the effect has been to encourage passengers to think of safety in boarding the cars.









Four signs that promote safety in El Paso

Maintenance Methods *and* Devices

Covering Protects Armatures

PROTECTION is afforded completed armatures in the shops of the London County Council Tramways, London, England, by encasing them in a covering of canvas and wooden strips. After an armature is wound, the connections to the commutator completed and the windings impregnated it is ready for the covering.

This covering is made of cleats of hard wood, attached at even distances on both sides of a strip of heavy canvas. The thickness of the cleats is such that they make the outside diameter slightly larger than that of the blower at the pinion end of the armature. The length of the cleats is such that they project over the commutator. The covering is held in place by straps, so that the entire device somewhat resembles a shawl strap.



This cover of wood and canvas is snapped on each completed armature to prevent mechanical injury

When the covering is placed on the armature it is an indication that the armature is completed. It remains on while the armature is in the shop and during its transportation to any car depot to which it may be sent.

Oiled Roadway as a Substitute for Paving

SATISFACTORY results have been obtained with oiled roadway between its tracks in several streets, instead of paving, according to the 1927 Coffin brief of the El Paso Electric Railway. Authority to use this substitute was requested originally of the authorities because of the high cost of paving, but the plan has also proved entirely satisfactory from a service standpoint.

The track area is filled up to the top of the rails with earth, to which crude oil is applied as a means of compacting the dirt and keeping down the dust. A little care is required to keep the space filled and smooth, and an application of oil has to be made twice a year, but when this is done the surface remains in good condition.

On certain streets where the natural soil did not take up the oil readily, the tracks were covered with a thin coating of fine crushed rock before the oil was applied. This was found to make an excellent surface.

The annual expense of maintaining and oiling these unpaved areas is less than 15 cents per foot of track.

Incidentally, the company is a large user of Tarvia K.P. for filling holes in paving and for replacing brick, wood blocks or asphalt which has to be removed when rail joints are repaired. The Tarvia is mixed cold with sand and small crushed stone in very much the same way as concrete is mixed by hand, the Tarvia taking the place of the cement. Once or twice a month a crew of four men can prepare enough of the mixture to keep them busy a week in making small paving repairs.

Tools Assist in Brush-holder Maintenance

By Jesse M. Zimmerman
Renewal Parts Engineer
Westinghouse Electric & Manufacturing Company

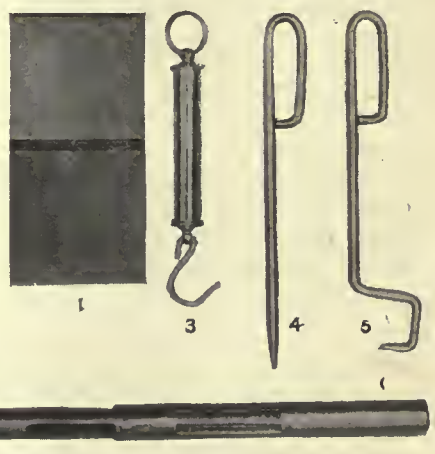
PROPER maintenance and inspection of brush-holders require a complete set of gages, scales and adjusting tools. Five tools desirable for the work are shown in the accompanying illustration.

1. The "Go" and "No-Go" gage is used to check the width of the carbon way. If the "Go" side of the gage enters the carbon way it is an indication that sufficient clearance will be insured when the carbon is placed in the box. If the "No-Go" side of the gage enters the carbon way it is an indication that the carbon way is too large, thereby permitting a loose brush fit. This tool is used by the manufacturer of the brush-holder, but the operator can make equally good use of it when he repairs the carbon ways of his brush-holders.

2. The spring scale shown has a fiber slide which is similar in dimensions to the carbon and takes the place of the carbon, thereby showing the true brush pressure exerted on the carbon during operation. This scale can be used only when the brush-holder is out of the motor.

3. The spring fish scale is very convenient for the car shop inspector, because it is small, easily handled inside of the motor and provides an accurate method of measuring the spring pressure.

4. Where the "twin washer" type of brush-holder mechanism is used a pointed tool is required to change the setting of the spring mechanism. The pointed end of the tool fits into any of the holes in the tension barrel, after which a pressure is exerted on the handle to relieve the tension on the



Desirable tools for proper maintenance of brush-holders

1. Go and No-Go gage for measuring size of carbon box.
2. Spring scale for measuring brush-spring pressure before brush-holder is installed.
3. Spring fish scale for measuring brush-spring pressure on inspection.
4. Tool for adjusting tension on "twin washer" type brush-holder mechanism.
5. Tool for adjusting pressure of ratchet type brush-holder mechanism.

cotter pin so it can be removed. The tension barrel is then moved in the desired direction, after which the cotter pin is inserted in another hole.

5. The ratchet type of mechanism requires a different form of tool for making the adjustment. The point of this tool is engaged in the notch of the ratchet wheel, thus holding the wheel stationary while the dog on the contact member is moved to the desired notch.

Cars Scrubbed by Schedule in Fort Worth

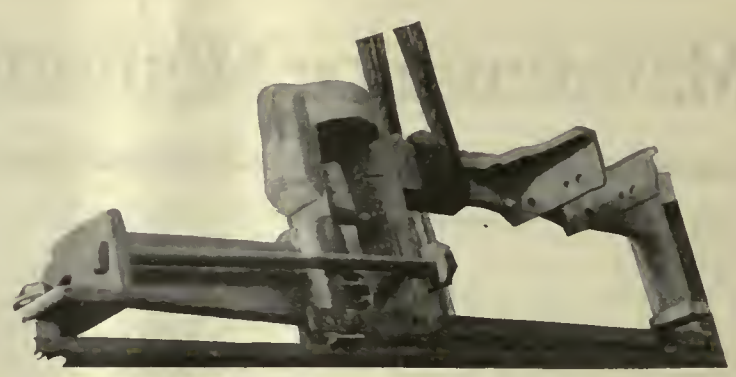
MORE attention to the appearance of both the interior and exterior of street cars is essential in its competitive campaign for passengers with the private automobile, the Northern Texas Traction Company, Fort Worth, Tex., believes. This means, besides fresh paint and varnish, more attention to car washing, especially as the repainting is done with lighter and brighter colors.

The new washing schedule, according to the company's 1927 Coffin Prize brief, calls for an inside scrubbing of the cars once every three months. This means that two cars have to be scrubbed every day. The work is done under the supervision of the paint foreman. The headlining, window posts, panels, seats and floors are scrubbed with soap and water. The car curtains and route signs are cleaned and the seats are rubbed with oil after the inside has had time for drying. The cars are then scrubbed carefully on the outside, touched up by the painter and left in the shop over night to dry thoroughly before going back into service.

Lining Up Broken Truck Sides for Welding

WELDING as an art has advanced to such a degree that a joint made in this manner is equal to or stronger than the original metal. However, if the welded parts are not in correct alignment the time and expense of the welding are wasted. This is particularly true of the welding of broken truck side pedestals. If these parts are not in alignment when reinstalled and are forced into their original positions undue strains are set up in the welded pieces. Misalignment or mechanical defects are created which may cause a failure of the weld or other mechanical ruptures.

This fact was appreciated by the mechanical department of the New York & Queens County Railway, New York City, in the Woodside shops and a simple but very effective method for assuring a correct alignment of the parts for the welding process has been developed.



Truck frame lined up for welding

A $\frac{3}{4}$x3-in. flat bar drilled for the correct end frame centers is bolted to the truck side end frame castings under the pedestals, so that correct alignment is assured when this is in place. A $\frac{1}{2}$x$1\frac{1}{2}$-in. bar drilled for the true centers of the pedestal tie bar bolts is bolted to the bottom of each pedestal. This places the outside surface of the pedestals in the proper alignment. A wedge placed between the end frame bar and the bottom of the broken pedestal is driven in until the proper distance from the spring casting to the bottom of the pedestal is obtained. This is set to a gage. An adjustable bolt placed on the face of the pedestal shoes permits the proper alignment to be obtained between the surface of the broken pieces and the paralleling of both sides of the pedestal. The two $\frac{7}{8}$-in. tie bolts inserted in the top of the end frame casting and through a plate on the back of the pedestal maintain the correct alignment and permit of the free movement without fear of changing the relationship of the various parts.

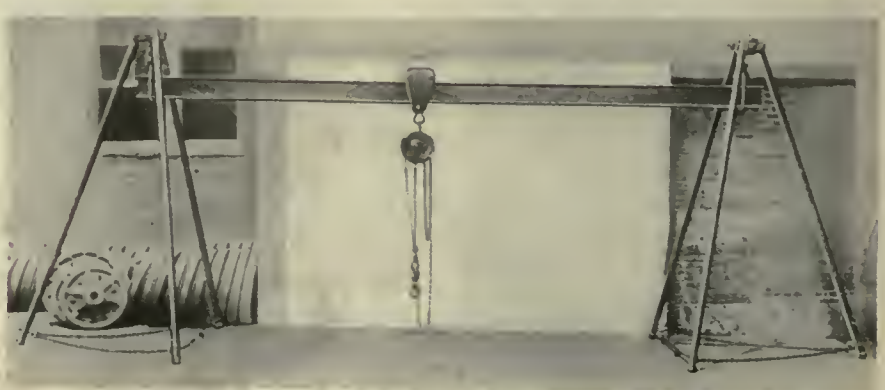
Since this method of aligning broken pedestals has been adopted no trouble has been experienced in reinstallation or welding failures.

Portable Crane Saves Labor and Speeds Work

HANDLING of rails and special work by the construction department of the electric railway system of the Arkansas Power & Light Company, Little Rock, Ark., has been made easier by a portable crane that was devised by the engineering department of the company. It was completed and installed in June of this year and has proved a great labor saver. Particulars are given in the Coffin brief for 1927 filed by the company.

The crane, which is shown in the accompanying illustration, is simple in construction and operation. It consists merely of two iron tripods, 8 ft. high; an 8-in. I-beam 20 ft. long and a chain block, carried by a trolley along the beam. A rail can be lifted from a pile on the ground and placed on the dolly by two men instead of the usual crew of ten or more. One of the effective features of the crane is the placing of the frogs and switches. With it the frogs can be set in the exact position that is required. In addition to the saving in time and labor, the portable crane has reduced accidents to workmen.

When the tripods of the crane are spaced 17 ft. between centers the beam is capable of holding 4,000 lb. The cost of the crane, including the chain block, was approximately $200.



Portable crane for saving labor and speeding work in use in Little Rock, Ark.

New Equipment Available

Grinding Compound for Valves

FOR grinding and polishing valves to give a smooth finish on the seat, a new grinding compound marketed under the trade name of "Arico" is announced by the American Hammered Piston Ring Company, Baltimore, Md. After using the compound, the seat is cleaned easily with water or gasoline. "Arico" is a water mixed compound and is sold through jobbers in ¼-lb. and 1-lb. tins. It is also supplied in small utility tubes.

Small Reversing Switches

SMALL switches for miscellaneous application as across-the-line reversing switches for small motors are announced by the General Electric Company, Schenectady, N. Y. These switches, which are of three types, bear the designations CR 7009-F-1, F-2 and B-10.

The CR-7009-F-1 and F-2 switches each consist of two 15-amp., double-pole contactors electrically and mechanically interlocked and inclosed in a drawn-shell inclosing case. They are for use with momentary-contact push-button stations. The F-1 form is without overload relays, while the F-2 form has Trumbull overload relays.

The CR-7009-B-10 switch consists of two three-pole, 25-amp. contactors mechanically and electrically interlocked. The switch is for use with a momentary-contact push-button station and has Trumbull overload relays.

All these switches are inclosed in a new type, drawn-shell inclosing case. They will find application wherever a small magnetic reversing switch is required.

Improvement Made in Rail Preheater

SEVERAL improvements in its rail preheater that add considerably to its efficiency and effectiveness are announced by the Metal & Thermit Corporation, New York, N. Y. The frame, which is cast in one piece, is of heavier material than was used formerly. Also, an oil reservoir is now provided which holds a sufficient quantity to keep the blower well supplied for a complete day's run. Another new feature is the introduction of a spiral spring to the hose connection that prevents the hose from kinking at the place of greatest wear. The new preheater retains all the desirable features of the old type, which include ball bearing motor, rubber tires, air strainer and compact design.



Improved type of rail preheater

Special Body for Line Maintenance

FOR quick repairs, line maintenance and pole setting, an advanced type of truck is announced by the Indiana Truck Corporation, Marion, Ind. The Model 115 includes a 2-ton chassis equipped with a special body and pole setter. The truck illustrated was furnished the Benton Harbor-St. Joe Railway & Light Company. It is provided with bows for a canopy or tarpaulin top and brackets on the side of the body for carrying the pole setter when dismantled. The body provides maximum tool and supply capacity with a minimum amount of space.

The pole setter is operated by a special winch mounted in front of the body and driven by a power take-off installed in the transmission.



Special body and pole setting equipment applied to 2-ton chassis for Benton Harbor-St. Joe Railway & Light Company

American Association News

Accounting Questions and Answers

Replies to questions submitted to accountants' standard classification committee and to the bureau of accounts of Interstate Commerce Commission are published

IN THE report of the Cleveland convention, published in the issue of Oct. 8 of this JOURNAL, page 697, there was a reference to rulings on certain accounting questions made during the year by the bureau of accounts of the Interstate Commerce Commission, acting in conjunction with the committee on standard classification of accounts of the Accountants' Association. These questions and answers form a part of the annual report of the committee on standard classification and are given below in slightly abstracted form. They throw light on the proper method of classifying complicated electric railway charges.

Q. Road A, a steam road line, owns a bridge and uses the center, which is double tracked, for its own traffic exclusively. On one side of the double track is a roadway used for vehicular traffic, and on the other side is a single track, owned and maintained by Road A, leased to Road B, an electric line. It is used exclusively by the latter to operate an electric car service. Road A charges Road B a fixed sum for rental of the right-of-way of the track and also a bridge toll of 40 cents per car each way. How should these payments be charged?

A. The exclusive use of certain tracks on a jointly used bridge constitutes joint use within the meaning of the text of account 97, "Rent of Tracks and Facilities." The entire amount paid by Road B to Road A should be charged to Account 97.

Q. Our interurban cars are equipped with portable telephones so that passenger train crews can report to the train dispatcher any trouble which they notice when they do not happen to be near a station. Should the maintenance of these telephone sets be charged to Account 18, "Telephone and Telegraph Lines," or to Account 30, "Passenger and Combination Cars."

A. The first cost of the telephone sets should be charged to road and equipment account 518, "Telephone and Telegraph Lines," and the cost of maintenance to operating expense account 18, "Telephone and Telegraph Lines."

Q. To what account should be charged repairs to gasoline motor cars used by sectionmen, bridge gangs and linemen in getting over their territory. It is my belief that Account 9, "Miscellaneous Track and Roadway Expenses," should be charged with the expense of repairs to sectionmen's speeders; account 15 or 24, the expense of bridge and building gang speeders; and 17, 18 or such other accounts to the linemen's expenses.

A. The initial cost of gasoline motor cars for use by employees should be included in account 512, "Roadway Machinery and Tools." The cost of repairs to these cars should be included in accounts appropriate to their use. In this connection see case 51, "Accounting Bulletin 14." Cases 4 and 182 to which you refer are applicable only to gasoline motor cars used in revenue service.

Q. Suppose an existing road with a total investment in roadway and equipment of $500,000, whose property has recently been appraised at $900,000, was bought at a reorganization for $200,000, how should the property of the new company be set up on the books? Would it be proper to take the appraised sound values and scale them down on a per cent rate to all units? In the opinion of the committee, account 527, "Cost of Road Purchased," would apply in accordance with instructions contained on page 91, paragraph 3, "Basis of Charges," in the Classification of Accounts.

A. The opinion of the committee is correct. The actual money cost of the property should be reflected in account 401, "Road and Equipment."

Q. This company operates through a subway crossing under another railroad and frequently has to meet flood conditions at this point. Should the charge for labor be made to operating account 8 and for meals and material to operating account 9, or for both labor and material including meals to account 16, which appears to cover the drainage of undergrade crossings? We are also installing a new pump, pump house, and sump at this location. Should this cost be charged to capital account 615, and the labor and material for the pump house to account 524?

A. The cost of labor used in taking care of flood conditions at this point should be charged to account 8, "Track and Roadway Labor." The cost of material used and meals furnished to the laborers engaged on this work to account 9, "Miscellaneous Track and Roadway Expenses." The cost of installing the new pump, pump house and sump, should be charged to account 524, "Stations, Miscellaneous Buildings and Structures."

Association Posters and Booklets

RECAPITULATION of the posters and booklets issued by the advertising section of the American Electric Railway Association has just been made and forwarded to publicity men of railway and manufacturer members, giving the prices, which range from nothing to a few cents for each poster or booklet.

There is a complete series of safety posters. Six are on general subjects. Then there are six posters in the "Safe Highway" series and five in the "Aunty Jay Walker" series. The first set was made for the purpose of educating employees in safe ways and can be used with good effect about carhouses, employee rest rooms, etc.

A booklet, "Safe," by Managing Director Lucius S. Storrs, which has just been issued, tells how electric railways carry passengers with the smallest number of fatal accidents per passenger of any transportation system in the world.

Eleven posters and three booklets form a series of publicity material on traffic congestion. The booklets include "New York's Traffic Congestion Problem," by Gerhard M. Dahl; "The New York City Transportation Problem," by Lucius S. Storrs, and "The High Cost of Congested Streets," by C. O. Sherrill. The last, which is a practical discussion of the nation's traffic congestion, not only points out the different phases of the problem but suggests definite solutions of it.

There is a series of eight merchandising transportation posters. Two special one-sheet size posters made for use on the sides of freight cars, on stations, etc., advertise interurban freight service. There is also a Christmas poster.

Besides these series of posters and booklets, there are numerous booklets of general interest. These are principally reprints of addresses made before association meetings and general publicity matter on the association and the industry.

It is stated that because of the size and weight it is not possible to send out complete sets of samples, but that particular samples will be sent out to those interested on request to association headquarters.

Street Signal Study Indorsed

WORK of the American Engineering Council in the matter of street signs, signals and markings was indorsed by the executive committee of the American Electric Railway Association at the meeting held on Nov. 11. The A.E.C. has been requested to make a national survey of the situation with the objective of determining the best practice in regard to these matters. The text of the resolutions adopted, which were submitted by Thomas Fitzgerald, vice-president Pittsburgh Railways, follows:

Whereas, the National Conference on Street and Highway Safety, under the chairmanship of Secretary Hoover, brought out the necessity for uniformity in traffic signs, signals and markings, and improved protection by use of suitable car loading platforms and safety zones.

Whereas, American Engineering Council has been requested to make a national survey of the present situation with the objective of determining the best practices as to signs, signals and markings, loading platforms and safety zones, as a means of facilitating traffic and increasing safety on the streets of the cities of the United States.

Whereas, the work of the American

Association of State Highway Officials in adopting standard signs, signals and markings, which standards are being installed on all federal aid roads, the necessity for developing standards for city streets is enhanced,

Whereas, studies have been and are being carried on in the principal cities of the United States approximating 140 in number, and a carefully selected committee has been appointed to represent all interests in this problem, including a representative of electric railways, and

Whereas, this committee needs the support of all parties interested in the problem because of its co-operation with other sub-committees of the National Conference on Street and Highway Safety, and

Whereas, it is proposed to develop a complete report on this subject and issue it for the use of all interested parties, therefore, be it

Resolved, That the American Electric Railway Association indorses this study and recommends that its constituent members help the work as they may deem fitting and proper.

More Association Committees Appointed

FURTHER announcements have been made by the association of committee appointments. Foremost among them is the American Association committee on publications, the personnel of which is now complete. In addition there are four Engineering Association special committees.

Announcement is also made that through error the name of W. R. Hulbert, New York, was included in the personnel of way and structures special committee No. 2. This should have been W. G. Hulbert, Easton, Pa., who has been a member of this committee for the past two years.

American Association

PUBLICATIONS

J. H. HANNA, president Capital Traction Company, Washington, D. C., chairman.
H. V. BOZELL, New York, N. Y., vice-chairman on *Aera.*
F. W. DOOLITTLE, New York, N. Y., vice-chairman on statistics.
J. L. ALEXANDER, Houston, Tex.
G. B. ANDERSON, Los Angeles, Cal.
T. W. CASEY, New York, N. Y.
CHARLES GORDON, New York, N. Y.
T. R. LANGAN, New York, N. Y.
H. H. NORRIS, Boston, Mass.
A. S. RICHEY, Worcester, Mass.
W. H. SAWYER, New York, N. Y.
R. S. TOMPKINS, Baltimore, Md.
E. P. WALLER, Schenectady, N. Y.

Engineering Association

POWER DIVISION—SPECIAL COMMITTEE NO. 3—POWER CONTRACTS

M. W. COOKE, superintendent power and incline Pittsburgh Railways, Pittsburgh, Pa., chairman.
J. WALTER ALLEN, Boston, Mass.
R. W. BAILEY, Kansas City, Mo.
T. H. CLEGG, Philadelphia, Pa.
H. A. KIDDER, New York, N. Y.
R. H. RICE, Chicago, Ill.
R. L. WEBER, Boston, Mass.
G. F. MCCLELLAN, New York, N. Y.

POWER DIVISION—SPECIAL COMMITTEE NO. 6—TROLLEY WIRE WEAR.

H. S. MURPHY, staff engineer Philadelphia Rapid Transit Company, Philadelphia, Pa., chairman.
J. WALTER ALLEN, Boston, Mass.
S. H. ANDERSON, Los Angeles, Cal.
W. H. BASSETT, Waterbury, Conn.
L. W. BIRCH, Mansfield, Ohio.
C. L. HANCOCK, New York, N. Y.
A. J. KLATTE, Chicago, Ill.
J. F. NEILD, Toronto, Ont., Canada.
JOHN ROSS, Pittsburgh, Pa.
ANGUS SCOTT, Cleveland, Ohio.
G. F. WENNAGEL, Baltimore, Md.

PURCHASES AND STORES DIVISION—SPECIAL COMMITTEE NO. 4—PRICE RECORDS AND PRICING MATERIALS

A. A. ORDWAY, Boston Elevated Railway, Boston, Mass., chairman.
A. E. HATTON, Pittsburgh, Pa.
E. A. MURPHY, Indianapolis, Ind.
C. THORBURN, Los Angeles, Cal.

ROLLING STOCK DIVISION—SPECIAL COMMITTEE NO. 5—ROLLER BEARINGS

W. C. BOLT, superintendent rolling stock and shops Eastern Massachusetts Street Railway, Chelsea, Mass., chairman.
H. A. ALLEN, New York, N. Y.
C. BETHEL, East Pittsburgh, Pa.
V. N. DELAMATER, Newark, N. J.
E. M. LUNDA, Grand Rapids, Mich.
K. W. MCPHERSON, Pittsburgh, Pa.
J. S. MCWHIRTER, New York, N. Y.
O. F. PACKER, Lawton, Mich.
W. C. SANDERS, Canton, Ohio.
G. L. SCHERMERHORN, Schenectady, N. Y.
W. C. WHEELER, Chicago, Ill.

WAY AND STRUCTURES DIVISION—SPECIAL COMMITTEE NO. 5—WOOD PRESERVATION

C. A. SMITH, superintendent of roadway Georgia Power Company, Atlanta, Ga., chairman.
M. J. CURTIN, Charlestown, Mass.
T. H. DAVID, Indianapolis, Ind.
W. H. FULWEILER, Philadelphia, Pa.
C. F. GAILOR, New York, N. Y.
E. F. HARTMAN, Kenilworth, N. J.
L. P. SCANLAN, Newark, N. J.
F. H. SWAYZE, New York, N. Y.
A. P. WAY, Philadelphia, Pa.
R. H. WHITE, JR., Atlanta, Ga.

WAY AND STRUCTURES DIVISION—SPECIAL COMMITTEE NO. 14—LIGHT SECTION RAIL

C. A. ALDEN, chief engineer frog and switch division Bethlehem Steel Company, Inc., Steelton, Pa., chairman.
B. R. BROWN, Dallas, Tex.
E. B. ENTWISLE, Johnstown, Pa.
H. M. FLANDERS, Springfield, Mass.
C. G. KEEN, New York, N. Y.

COMING MEETINGS OF *Electric Railway and Allied Associations*

***Nov. 28-30*—American Institute of Electrical Engineers, regional convention, Drake Hotel, Chicago, Ill.**

***Dec. 1-2*—Pennsylvania Street Railway Association, annual meeting, Scranton, Pa.**

***Dec. 2*—American Institute Electrical Engineers, New York Section, Engineering Societies Building, New York, N. Y.**

***Dec. 2*—Metropolitan Section, American Electric Railway Association, Engineering Societies Building, New York, N. Y.**

***Dec. 7*—Power Transmission Association, annual meeting, Hotel Commodore, New York, N. Y.**

***Jan. 16-17*—Midwest Electric Railway Association, Hot Springs, Ark.**

***Jan. 18-19*—Kentucky Association of Public Utilities, annual meeting Brown Hotel, Louisville, Ky.**

***Jan. 25-27*—Electric Railway Association of Equipment Men, Southern Properties, Roosevelt Hotel, New Orleans, La.**

***Jan. 26-27*—Central Electric Railway Association, Cincinnati, Ohio.**

***Jan. 31*—New York Electric Railway Association, annual meeting, Hotel Commodore, New York, N. Y.**

National Relations and Depreciation

THE committee on national relations and the sub-committee on depreciation of the American Electric Railway Association met at Washington, D. C., on Nov. 8 under the chairmanship of J. H. Hanna, president Capital Traction Company of that city. The meeting was called for the purpose of discussing what action was to be taken by the American Electric Railway Association in connection with the hearings of the Interstate Commerce Commission relative to depreciation. The commission had set down the following day, Nov. 8, as that on which the steam railroad rehearing in Docket No. 15100, and the telephone rehearing in Docket No. 14700 should be begun, and also the hearing on Ex Parte 91, which concerns the new classification of accounts.

The chairman of the sub-committee on depreciation, Dr. Thomas Conway, Jr., outlined what his committee had done in the matter of collecting and tabulating material which would show the effect of the application to electric railways of an order similar to that contained in Docket No. 15100. He pointed out that a very critical situation existed for electric railways, due to the fact that any depreciation accounting system or system of accounts required by the Interstate Commerce Commission would probably be promptly adopted by the state commissions and thus made applicable to electric railways, whether or not they reported to the Interstate Commerce Commission.

Judge Ralph R. Bradley of Chicago then read to the committee the statement which he proposed to make before the commission to the effect that the Electric Railway Association proposed to appear before the commission as a voluntary body, without prejudicing the right of any individual carriers to conduct their own case, but in order to demonstrate to the commission that the case of the electric railways is so entirely different from that of the steam railroads as to justify entirely different treatment. On that account he asked that the commission grant the opportunity for this industry to present its testimony at the conclusion of the hearings in Docket No. 15100 concerning steam roads, but *prior* to the promulgation of any order on the part of the commission in relation to steam roads.

The new system of accounting depreciation, if applied to electric carriers —and the commission has already issued one order calling upon our industry to show cause why Docket No. 15100 practically in its entirety should not be applied to electric railways— would make necessary an entirely new division of those accounts which contain depreciable items. It would obligate the carrier to determine as best it could the prospective service lives of the various items which constitute its property and to depreciate the said property on the basis of the service lives so determined. The commission's order calls for the application of depreciation accounts to almost all of the items of steam and electric railroads, including ties, rails, etc.

The commission recommends the group system as opposed to the unit system and also the straight-line method as opposed to the sinking-fund method.

Probably the part of the commission's order to which greatest exception can be and is taken is that to determine past accrued depreciation and to credit this to the depreciation reserve and concurrently charged to the asset side of the balance sheet. The effect of such an order would be to wipe out the surplus on a vast number of railroads and materially to disturb their credit. If the same provision were to be applied to the electric railways, it would without doubt injure their credit to such an extent as to render continuance of operations impossible.

The discussion in the committee revealed the fact that its various members are fully alive to the situation and are determined to make as vigorous a fight as possible in order that such system of accounting may not be imposed upon the industry.

The hearings are being watched in Washington at the present time by a member of the association staff, and it is hoped that ample notice will be given to the industry before it is called upon to give its testimony. The committee on national relations approved the report presented by Dr. Conway and authorized his committee to proceed to represent the association in any matters before the Interstate Commerce Commission.

News of Other Associations

New York City's Suburban Transit Problem*

Reservoirs in the outlying district fed by diverging transit lines and reached by north and south tubes in Manhattan would decentralize traffic and relieve the present congested condition

By Leverett S. Miller
President New York, Westchester & Boston Railway, New York, N. Y.

SOLVING the suburban transit problem of the metropolitan area of New York City is closely related to and dependent upon the solving of the urban transit problem within the city. It is my opinion that no adequate suburban plan can be developed efficiently, economically and conveniently to handle this metropolitan district traffic to and from the greater city of New York until the city has developed a plan, not by piecemeal but as a whole, for the handling of its own city traffic with which the suburban facilities may be co-ordinated.

Visualize the development of New York's great water supply and distribution system. As the city grew to the north, the main reservoirs of supply were moved beyond the density of population and the distribution to the consumer accomplished by aqueducts and systems of mains running north and south through Manhattan, the supply coming from watersheds to the north.

Here, to my mind, is a very good simile of an adequate and practical plan for suburban transit—the commuters being gathered through the outlying metropolitan district by a network of diverging transit lines, brought to distributing reservoirs located about the perimeter of Manhattan and then distributed through Manhattan by the various north and south transit lines of the city, built and to be built as a part of the city transit system.

Various plans have been proposed for the distribution of suburban traffic through Manhattan, the essential features of which have been the extension of the suburban carrier lines into and through Manhattan. It is my belief that these would only tend to centralize, rather than decentralize, the flow of traffic upon the streets. The claim that such an arrangement would lessen the inconvenience of transfer is exaggerated.

Would it not be more practicable to distribute the suburban travels through reservoirs, or terminals, at the extreme ends and possibly at the center side lines of Manhattan and thence through tubes extending east and west and lying below the main north and south rapid transit lines, built and to be built. This arrangement, with convenient transfer facilities, would permit the incoming suburban passenger to select a north or south rapid transit line which would take him nearest to his destination within the city. The system would also decentralize the traffic on the streets.

The changing of centers of business within the greater city of New York is also a factor to be considered in working out a plan for the distribution of suburban travel. The constant growth to the north and the shift of business centers east and west make questionable any plan of distribution in Manhattan through a single tube, or even through two tubes.

The problem of handling the suburban travel includes not only transporting the commuter from his home town to the city, but also from his home to the station where he boards the train. It is my thought that any adequate suburban transit plan should include a system of motor coach transportation in the home towns co-ordinating with the rail service, thereby furnishing a cheaper method of transportation between the home and the station than the privately operated car and lessening the congestion on the highway and in the parking spaces at the stations. By this means the development of property at right angles to the rail lines would become possible.

**Abstroct of a paper presented before the New York Section, American Institute of Electrical Engineers, Nov. 4, 1927.*

Winter Meeting of New York Electric Railway Association

THE executive committee of the New York Electric Railway Association has selected Tuesday, Jan. 31, 1928, as the date of the winter meeting of that association. It will be held at the Hotel Commodore, New York City.

Met. Section Meets Dec. 2

FRIDAY evening, Dec. 2, 1927, the Metropolitan Section, A.E.R.A., will hold a joint meeting with the New York Section of the American Welding Society. After a Dutch treat dinner at Friedlander's Restaurant, International Night will be observed at the Engineering Societies Building. The feature of the evening will be lantern slides and movies of street railways in vacation lands. Rail joint welding will be discussed by F. B. Walker and E. M. T. Ryder, followed by a general discussion.

News of the Industry

Five-Cent Rate Assailed

Rehearing on Oakland fare order to be held on Nov. 26. Company says order is confiscatory

ASSAILING the proposed 5-cent zone rate as confiscatory, the Key System Transit Company, Oakland, Cal., has appealed from the order reducing fares in the East Bay district and asked for a rehearing. The formal petition was filed on Nov. 19 with the California Railroad Commission. Officials of the company declare that if the rehearing is not granted they will appeal to the courts. In the petition the company declares that the 5-cent basic fare schedule will cause an annual operating deficit of not less than $693,531 and will force the company into receivership.

The commission is charged with negligence in failing to discover the transportation needs in the East Bay, in failing to discover the reproduction cost new less depreciation of the properties, in failing to find the fair value of the properties, in failing to find what would be a fair and reasonable return upon the properties, in failing to find the amount of net revenue needed to constitute a fair return and in failing to find the amount of additional net revenue which would be produced by the rates desired by the commission.

The petition cites the schedule of 1925 advancing traction line fares from 6 to 7 cents and ferry fares from 18 to 21 cents. This schedule, it is pointed out, was designed to increase the company's net operating income $846,000 yearly, but actually resulted in an increase of only $277,870. An increase in its net revenues of $1,000,000 yearly is needed to bring a fair return on the company's investment, the petition declares. The commission has agreed to hear the company's petition on Nov. 26 sitting *en banc*.

Preston Higgins, city attorney of Oakland, declares that Oakland will brook no delay in the case and that if the company is granted a rehearing the city will demand an extension of the 5-cent zone to include a portion of East Oakland. The Railroad Commission, in fixing the first zone, has discriminated against residents east of Lake Merritt, Mr. Higgins said.

Delay Likely in Considering New Toledo Grant

The election of William T. Jackson, former city service director and a strong advocate of city planning, as Mayor of Toledo without any political party backing him and no pre-election promises, appears to have changed the aspect of the franchise situation in that city.

Company officials who have been at work on an amended Milner ordinance to carry out the plans of the board of control and company officials agreed upon several months ago and who have completed a rough draft of the new ordinance question the advisability of bringing the measure before the public until the new law director has been named and the policy of the Mayor-elect determined.

The new Mayor is an independent who has inherited much of the old-time independent political strength in Toledo, but the City Council is strongly regular in political affiliation with practically the same character as has controlled in the last four years.

Both Mayor and Council would first have to agree on the terms of the ordinance before it could be brought before the people with any prospect that it would be approved. Many observers believe that almost any organized opposition to a new ordinance would mean its defeat. Under the circumstances it would appear that the entire matter may have to wait two months until the new administration takes office.

Union Agreement Discussed

Receivers of Des Moines City Railway have control over contracts. Nothing definite on one-man car issue. Service and rates to remain unchanged

SPECULATION as to the future of the two-man car agreement between the union and the Des Moines City Railway, Des Moines, Iowa, completely overshadowed all other phases of the receivership of the local railway during the week ended Nov. 19 when Federal District Judge Martin J. Wade issued a supplemental order apparently giving the receivers full power to terminate or suspend the contract.

The supplemental order followed the appointment of C. L. Herring and F. C. Chambers as receivers on Nov. 11. It authorizes them "to elect, to adopt or continue in force, or to refuse to adopt or continue in force any agreement, lease or other contract for operation which may be included in the property of which they are appointed receivers, whether made by the Des Moines City Railway or by any predecessor thereof."

The order goes on to say that "such election may be made from time to time and shall be made in writing, subscribed by said receivers and filed in the office of the clerk of the court subject to the approval of the court thereof, copy to be served upon the other party in interest, and no conduct or use of rights or payments made by said receivers, as rent, wages, or otherwise, or any other acts and omissions of said receivers . . . unaccompanied by the filing of such written instrument shall be deemed to conclude said receivers in respect to such election or be deemed to constitute an election to adopt or continue in force any such contract, lease or agreement."

The order is generally interpreted here as leaving the door wide open for the institution of one-man car service in Des Moines under the receivership. And although the court refuses to interpret his order and the receivers are noncommittal on the matter, they have assured the public that there is no present intention to curtail service, to increase fares or abolish the $1.25 weekly pass which allows unlimited riding for a seven-day period. It was pointed out that this leaves the one-man car as the only economy move left to the receivers of the railway, which had accumulated an operating deficit of $129,000 for the first nine months of 1927.

F. C. Chambers, president of the railway, who was put in full charge of all operations in connection with the property, with C. L. Herring, Des Moines business man, acting in an advisory capacity, estimates that one-man car operation would mean a saving of from $250,000 to $300,000 in trainmen's wages annually. Both figures are considered conservative, as the company pays slightly more than $700,000 yearly to motormen and conductors. However, the expense of extra trainmen for the loop district during the morning and evening rush hours is anticipated in both estimates.

The report of the court's supplemental order and its probable meaning brought forth a hot retort from J. Ben Wiley, secretary of the car men's union, who was instrumental in framing the twenty-five-year agreement which the Iowa Supreme Court has ruled binding upon the Des Moines City Railway until 1940. Mr. Wiley declared that in no city of the country had one-man cars resulted in a net lowering of fares which prevailed under two-man operation. He charged that the receivership was only a "camouflaged attempt" to get rid of the agreement and quoted the preamble of the agreement to establish that it was made between the union and the city railway and its "successors, heirs or assigns." Mr. Wiley served notice that the union will go to court to fight any attempt of a possible purchaser of the railway to evade the two-man car clause of the contract.

Another Big Purchase Payment Ahead of Seattle

The Seattle Municipal Railway, Seattle, Wash., is again facing a financial crisis, for during the next few months sufficient money must be put aside from the revenues to meet another big payment due on the bonded debt on March 1. In consequence city officials plan to take immediate steps to make the most of a ruling by Judge Frank S. Dietrich of the United States District Court of Appeals, dismissing two suits involving the railway. These suits, one by the Puget Sound Power & Light Company and the other by John G. Von Herberg, both seeking to establish a priority lien on the department's revenues, have blocked negotiations and improvements.

The litigation has held up negotiations between Mayor Bertha K. Landes and the City Council, and A. W. Leonard, president of the power company, for an extension of time for the railway to pay on its railway purchase debt. Mayor Landes states that Mr. Leonard has signified his willingness to confer with members of the Council at any time. The latter body plans to renew its suggestion that the annual bond payment be cut from $880,000 to $500,000.

The City Council is also considering the plans for readvertising for bids for the building of 80 new cars for Seattle. A previous contract for building the cars was never signed because of a controversy over the matter of the priority of the obligations the city proposed the car builder should accept.

The Council also plans the passage of a $500,000 bond issue for construction of a railway trestle across the West Duwamish Waterway alongside the West Spokane Street traffic bridge. Construction of this trestle was contemplated in the $1,875,000 railway bond issue authorized for purchase of the cars and for minor track extensions. If a market is found for the bonds the trestle work will proceed at once and the cost of that construction and the new cars will be met by a single bond issue.

Get-Together Meetings in Philadelphia

Something entirely new in Philadelphia Rapid Transit Company activities took place on the night of Oct. 25 at the Luzerne auditorium, when the first get-together meeting was held. These meetings were begun with the idea of furnishing entertainment and enjoyment for the P.R.T. family. It was a rollicking party, topped off with snappy music and singing, and a short, well-pointed talk by President Senter. This speech of welcome was a typical genial Senter statement, in which he spoke of the P.R.T. co-operative spirit. He reminded the men of their pledge at the picnic meetings on the subject of wills, and urged them to take immediate care of this matter. The committeemen were also introduced by Mr. Nece at the conclusion of his talk.

This meeting was the first of a series planned to come at intervals of a week or ten days. The nights and locations will be changed each week, thus making it convenient for employees living in all parts of the city to attend at least one meeting near home. The program will follow the same lines as the one at Luzerne, with music, dancing and entertainment, but the entertainment features and speakers will vary.

Court Upholds Boston Transit Plan

In a 10,000-word opinion filed on Nov. 22 with the clerks of the State Senate and House, the full bench of the Supreme Judicial Court of Massachusetts clears the way for the enactment of a definite program by the Legislature of 1928. Answering 24 specific queries propounded by the House and eleven by the Senate, the Supreme Court makes these important findings:

That the Harriman bill of 1927, which contemplated the creation of a metropolitan transit system, with important rapid transit additions in and out of the city of Boston, is constitutional in almost every detail.

That the Commonwealth may lend its credit to this metropolitan transit system in order that improvements may be financed at about 4 per cent rather than at 6 per cent as under the existing public control.

That the Legislature has the right to liquidate the affairs of the elevated company to bring about the retirement of the 7 and 8 per cent preferred stock.

That the Legislature, in order that the cost of these improvements should not be borne entirely by the car rider, may assess betterments on the land area which will receive benefit and advantage beyond the general advantage to the community.

That new rapid-transit improvements, built with public money, may be leased to the operating company for a rental less than the sum necessary to meet interest and retirement charges and the deficit made up through betterments or the levying of taxation on communities benefited.

The ruling is regarded as opening the way to legislation to develop a metropolitan transit system in which the Boston Elevated Railway will participate.

Something New in Regulation

The application of the first four aerial transportation companies for State charters and for the right to operate airplanes in Pennsylvania were scheduled to be heard before the Public Service Commission on Nov. 3. The applications for incorporation were first filed with the State Department, which sent them to the commission for hearing before acting. The companies propose to carry not only passengers but freight, baggage and mail. The four applicant companies are the Gettysburg Flying Service, Gettysburg; the Pennsylvania Aerial Transportation and Express Company, Wilkes-Barre; the Reading Airways, Reading, and the Noble Aircraft Company, Pottsville.

Loss to Utilities Small from Washington Tornado

Washington utility companies, after an estimate of the damage done by the recent storm, found their losses were insignificant considering the velocity of the wind, which reached 125 miles an hour. Some 200 houses were destroyed or damaged and the Navy Yard and Naval Air Station, which were also in the path of the tornado, suffered slight injury. A few hundred feet of power lines were blown down, a number of conduits were flooded and several carhouses partially unroofed.

The street railway service suffered more by the accompanying rain than by the wind, due to the fact that the conduit system used in Washington becomes flooded when the sewers are overloaded and the immediate lines affected are thus put out of commission. Service on the lines of the Capital Traction Company was halted for only eleven minutes, due to flooded conduits, according to R. H. Dalgleish, chief engineer. This was practically the only damage suffered by the company except for the destruction of a large skylight at the Navy Yard carhouse. Mr. Dalgleish estimated the loss suffered by his company at $900.

The Washington Railway & Electric Company experienced most of its trouble as a result of tin roofs being blown on power lines, according to J. H. Stephens, superintendent of railways. There was a delay of 45 minutes on the Benning Road line due to this cause. A car was proceeding along this line as the storm struck, but possible injury to the passengers was prevented by the prompt action of the conductor in calling to them to lie down and pull their coats over them, thus preventing injury from flying glass as the windows were blown in. On the Anacostia line service was blocked by a large tree that had been blown across the tracks. The company also suffered several "water grounds" in its conduit sections and experienced trouble with the signals on its Rockville division, due to lightning interference. A portion of the roof of the East Capitol Street carhouse was torn off.

The Potomac Electric Power Company was fortunate in that the storm struck the section of the city where its lines are underground, according to R. B. Patterson, superintendent of distribution. Three overhead feeders were blown down and service lines to the wrecked houses were destroyed. The storm missed the Benning power house by a mile.

Fares Cut to Stimulate Riding

The Potomac Edison Company, operating local street car and bus lines at Cumberland, Md., has announced a reduction in fare from 7 to 6⅔ cents. The cut is to take effect at once. Thomas W. Peters, local manager of the company, said the reduction was made to stimulate riding.

A Fool There Is

Providence people watch Mr. Autoist lose time, temper and trade, and then, lo, he reforms and rides the street car

"DRAW a picture and then he'll see it" has often clarified an abstruse problem. Of late, illustration of an argument has found its forte in the producing of a motion picture. A contention that it is more convenient, economical and in many instances time-saving to use the street car to and from business, compared with the automobile, has been explained in public speeches by the United Electric Railways, Providence, R. I., for several years. A decision was reached to prove the point by placing before the public a motion picture.

The picture, "East Side, West Side—All Around the Town," was made. All of the scenes are laid in Providence and all members of the cast are employees of the company. It depicts Messrs. Trolleyite and Autoist leaving their homes for their offices in the business center at 8:05 a.m. As a neighbor Mr. Autoist invites Mr. Trolleyite to ride with him, but the latter refuses, making it known that he prefers to use the trolley.

Mr. Trolleyite rides in comfort, reads his newspaper and reaches his office at 8:30 a.m.; 25 minutes is consumed for the journey. He is in a pleasant frame of mind, is courteous and polite to everybody and the day begins smoothly.

Mr. Autoist does not fare so well. He opens the garage door, gets into his automobile, backs it out, jumps out of the automobile, closes the garage door, re-enters the automobile and finally starts. Then troubles follow. A near collision with another automobile; waits at important cross streets for traffic to pass; impatient waits at busy corners in the business center; the vexing search for a parking space. Mr. Autoist finally breathes a sigh of relief when he stops at the curb to park, but becomes exasperated upon discovering a "No Parking" sign. He at last finds a parking space a considerable distance from his office location. He walks and arrives at his office at 8:50 a.m., twenty minutes later than Mr. Trolleyite, and both left their adjoining homes at the same time. He is cross and irritable. He discovers that he has lost a very important business deal that meant a good profit to him. He talks to his secretary about his late arrival, caused by traffic delays. His secretary advises him on the dependability of the trolleys in going to and from business. Mr. Autoist resolves to use the electric railway. The next morning he is seen boarding the trolley with Mr. Trolleyite and all is well.

The picture consumes thirteen minutes in its presentation. It was first shown to the public at the Electrical Exposition held at the Rhode Island Auditorium in Providence, Oct. 8 to 15, inclusive. The exposition was attended by approximately 50,000 people and 12,982 persons saw the picture. The fact that more people did not see the picture was due to the fact that they could not get near it owing to the vast crowds that surrounded the booth in an endeavor to gain admittance. Only in the afternoons was freedom of passage to be found in the vicinity of the booth.

What proved to be a leading attraction was the exhibit of the United Electric Railways in the form of a street car 40 ft. long. Modern leather seats were installed with a capacity of 42 persons. One side of the car was closed in through the use of windows containing photostats illustrating twelve ways in which street car transportation benefits the community. The car model served as a motion picture booth. The model was made as realistic as was possible. Thirty cards with snappy, appropriate slogans pertaining to the railway business occupied the space devoted to car card advertising in a real street car. It was a fine opportunity to register some vital facts.

In the making of the picture and in the use of all publicity material in and outside of the car model the company took particular care to avoid making any ill references or casting any unsavory reflections on the industry's greatest competitor—the automobile. All efforts were devoted to merchandising the service and selling rides on the basis of economy and convenience of service and the time-saving under certain conditions.



The movie fan was made comfortable



A study in contrasts dating back to horse car days



Crashing the gate to see the Providence picture

The attendant for the company, a neat-appearing, tactful starter in uniform, did not hear a single antagonistic or adverse comment from the thousands who viewed the picture. Many praiseworthy comments were heard, some of them being, "It is the truth," "Clever," "Very Good," "O.K." The exhibit was so well liked that strong and attractive inducements have been made to the company to install it at other expositions, exhibitions, shows and the like.

Nine-Cent Cash Fare in Rochester

An increase in cash fares from 8 to 9 cents on the Rochester lines of the New York State Railways, effective on Dec. 1, has been announced by City Railway Commissioner Charles R. Barnes. On the same day a new subway railroad, which is to be operated by the railway under the service-at-cost contract, will open. Commissioner Barnes said, however, that this event did not have any bearing on the fare increase. He attributed the fare advance to a burden of $631,383 from paving cost during the year. Fares in Rochester are based on a balancing fund which specifies that when there is a deficit of $100,000 the cash fare shall be raised 1 cent. On Oct. 1 the deficit was about $415,000 and approval of the State Public Service Commission is not necessary to increase fares in Rochester. Under the new schedule six tickets are to be sold for 50 cents with a 5-cent cash fare for children between ages of six and twelve.

Counsel Explains His Stand

Mr. Untermyer states the case for recapture and unification as he sees it. Favors city and property benefited standing construction costs

SAMUEL UNTERMYER, special counsel to the New York Transit Commission, addressed the Flatbush Taxpayers' and Civic Association on Nov. 21 on the present transit situation and his speech was an exposition of the case for the continuance of the present 5-cent subway fare and of his own plan for its continuance with equal justice to the car-rider, the city and the present transit companies. Among other things he said:

It is passing strange that although this is the most acute problem of the day for the city there is today less real understanding of the problem and more persistent, wide-spread misunderstanding than of any other question with which we had to deal.

Take, for instance, such questions as (1) the adequacy of the 5-cent fare, (2) of recapture and (3) of the effect of recapture on the public convenience, as dealt with both by its advocates and opponents. The advocates of a 5-cent fare may be divided into these three classes:

1. Those who favor it just because and only because they want to ride as cheaply as possible and regardless of the justice or economic soundness or consequences or the effect on the service of an inadequate fare and who know and care nothing more about it. It may be that they are in the majority, but I do not believe this to be true. The people are not quite so stupid as to believe that the cost of the service must not be paid somehow and somewhere.

2. There are those who, like myself, advocate and insist upon the adequacy of the 5-cent fare, so far as concerns the existing subways, who have become convinced from an intimate study of facts and figures, aided by experts, that if the city will take back its existing subway properties it can, by the expenditure of a moderate sum of money, furnish a vastly improved service and can, by the expenditure of less than one-fifth the cost of building new subways of the same capacity, increase the capacity of the present subways by at least 25 per cent and make plenty of money on the city's investment on a 5-cent fare—after paying the companies a substantial profit on the investments of the latter in the subways.

3. There is a considerable body of just, well-meaning and thoughtful people who favor an increased fare under the mistaken belief that an increased fare will in some mysterious, unexplained way improve the service. None of them has, however, shown how an increased fare will furnish an additional car or seat or otherwise improve the service.

When the city gets back these properties (properties in which it has invested $269,000,000, which with accumulated interest totals more than $330,000,000), a 5-cent fare will enable it not only to pay the interest and sinking funds on what the companies are entitled to get in return for their investment together with a bonus or profit to them of 15 per cent, but will also pay the interest and sinking fund on the city's present "frozen credits." It will be more than adequate for every purpose, including interest on the cost of improving the service on the existing subways. Detailed figures in support of these statements remain unchallenged.

This ceaseless repetition of a meaningless word has created an impression that there is something morally wrong or unjust about the exercise by the city of its right to terminate this lease on the terms prescribed by the lease. There never was a more wicked, willful falsehood—and all because of the use of the word "recapture" as a short and convenient term by which to define the contract right of the city to terminate the lease and take back its property on repaying the investment and a substantial profit for that right.

Although it would be to the manifest interest of the city and strictly within its legal and moral rights, it is not and never was intended that the city should recapture its recapturable subways and leave the balance of the rapid transit system—being the elevated roads—in the hands of the companies if the latter desired to, or were willing to sell the non-recapturable rapid transit properties on reasonable terms. The insidious attempts to create a contrary impression never had the slightest foundation or excuse. It is contradicted by every word and line of the report and recommendation of special counsel for the Transit Commission, by reference to which it will be found that the Interborough is offered $245,000,000 in city bonds, to include all its properties, subway and elevated, and that only in the event that it refused the offer, was "recapture" recommended.

No one has ever suggested that this was not a generous offer. If it is refused, what is there left for the city except to take back the properties to which it is entitled?

I do not think it will be betraying confidence to express the hope and belief that in the plan that will be put forth by the Transit Commission, a definite offer will be made to purchase the B.-M.T.'s elevated lines at a fair price, although for the year 1926 they did not earn within $812,000, and for the year 1927 not within $688,000 of their fixed charges.

If the B.-M.T. persists in its present attitude, what is there for the city to do, in order to unify its properties in connection with the subways now under construction, except to exercise its contract right to take back the B.-M.T. subway properties, all of which are city owned and all of which the city is entitled to recover?

The acquisition of the city-owned recapturable properties will give the car rider a longer haul than at present on the same lines for a 5-cent fare. In no event would he be inconvenienced or have to pay a double fare. It is about time to explode that bugaboo, which is causing so much unnecessary concern and creating so much false sentiment against the carrying out of the plans for unification.

In speaking of the adequacy of the 5-cent fare I have, thus far, confined myself to the existing subways. Those now under construction, if operated independently of the present subways, will pay considerably more than their operating expenses, but they will come far short of meeting their fixed charges on the present cost of construction and equipment. They can, however, in either of two ways, be made to pay on a 5-cent fare.

How to Get New Subways at 5 Cents

The first is by the Delaney plan, under which 62 per cent of the construction cost is added to the budget in yearly installments, so that only 38 per cent of the cost will be represented by city bonds, on which interest and sinking fund must be paid.

The other way, and what we are now undertaking to do, is to join and unify the new subways with the present subways, as purchased or recaptured by the city. The latter is now appropriating, paying and including in the annual budget $12,740,000 to meet the yearly fixed charges on the outstanding bonds that were issued for the construction of the present subways—from which the companies are corralling all the earnings to the total exclusion of the city.

Is it just that the car rider shall be burdened with the entire fixed charges on the construction cost of these subways into new territory, which cannot pay at the outset? Or is it fairer that the construction cost shall be paid in part by the property developed and in part by the city, which is also benefited in the way of increased assessment values? My idea is that the fare payable by the car rider should represent the entire cost of operation and one-half of the fixed charges on the cost of construction, and that the remaining one-half of the construction costs should be borne between the benefited property and the city.

Before closing, let me repeat the assurance that through unification you will have an improved and not impaired service. And let me warn you against standing in your own light by taking counsel of the fear that anything will be attempted that will dismember, cripple or impair the service. Do not permit yourselves to be misled. If we cannot do something largely constructive we do not deserve to succeed. The companies are playing for big stakes. One cannot blame them for fighting hard to hold on to your property, if they can. But so are you, for your stake in this great adventure is the ultimate welfare of your city.

Dispatch Freight Service Termed Successful

After a month's operation the new dispatch freight service which was started Oct. 1 by electric railways in Ohio and Indiana has proved itself to be a successful addition to the companies' transportation activities, according to officials of the traffic department of the Union Traction Company. The service is offered by eighteen electric railways operating in the two states and extends to Columbus, Cincinnati, Dayton, Lima, Toledo and Springfield, O.; South Bend, Peru, Fort Wayne, Lafayette, Terre Haute, Richmond, Greensburg, and Connersville, Ind.; Louisville, Ky., and all intermediate points. The service is available over the following electric lines: The Chicago, South Bend & Northern Indiana Railway, Cincinnati, Hamilton & Dayton Railroad, Dayton & Troy Electric Railway, Dayton & Western Traction Company, Fort Wayne-Lima Railroad, Indiana, Columbus & Eastern Traction Company, Indiana Service Corporation, Indianapolis & Cincinnati Traction Company, Interstate Public Service Company, Lima-Toledo Railroad, Northern Indiana Power Company, Southern Michigan Railway, Southern Ohio Public Service Company, Terre Haute, Indianapolis & Eastern Traction Company, Toledo, Bowling Green & Southern Traction Company, Union Traction Company of Indiana, Western Ohio Railway and the Winona Railroad.

Fast transportation of merchandise affords the opportunity of buying on a smaller scale with a quicker turnover at greater profit, it is said.

Pleas and Pledges for Safety Sake

Nearly 200,000 persons have pledged themselves to use courtesy and caution on the highways during the coming year, the American Road Builders Association has announced in reporting the progress of its national highway safety campaign. The association is offering $1,000 in prizes for the best ideas that may be used in promoting safety on the streets and highways. It states that more than 22,000 persons have been killed on the streets and highways of the United States during the first ten months of 1927. Included among the objectives of the movement are the education of motorists and pedestrians in the ways of safety.

Minneapolis Suburb Seeks Fare Reduction

An interpretation of the Brooks-Coleman law vesting control of rate making in the Minnesota Railroad and Warehouse Commission has risen through application by Robbinsdale, a suburb of Minneapolis, for a reduction of the car fare from 11 cents. The suburb has voted against annexation by Minneapolis. The Attorney-General of the state has notified the village that the commission has no authority to adjust rates between contiguous municipalities. The line is part of the Minneapolis Street Railway. The rate in the city is 8 cents cash.

$2,000,000 Headquarters Opened in New Orleans

Invitations were sent out recently welcoming the public of New Orleans to the opening of the new $2,000,000 home of the New Orleans Public Service, Inc., on Nov. 7. It was proposed to have young ladies in the employ of the company present each guest with a pink carnation and serve each of them with a cup of real French-dripped coffee. Heretofore the headquarters of six or seven departments have been scattered in buildings removed from the main office, but from now on all departments will be housed in the new building, at Baronne and Union Streets. This structure represents the most modern development of office building construction. In planning it the convenience of customers has been considered as well as that of the workers. As a result the building is a model example in efficiency and comfort. Certainly it is one of the best equipped structures in the South devoted exclusively to housing a corporation.

The mechanical equipment of the building deserves special attention. The elevators are of the signal control type which is the latest development in elevator design and control; the telephone room has a complete automatic switchboard for the handling of calls in the building and calls coming into and going out from the building. In addition to this, there is a private inside telephone system connecting the executives with departments where quick and private communication is desirable. There are also telautograph and pneumatic tube systems.

The first floor is lighted entirely by indirect lighting reflectors concealed in plaster brackets attached to the columns. The upper floors are lighted entirely by indirect lighting fixtures suspended from the ceiling as it has been found after considerable experiment that the full indirect system of lighting gives the most satisfactory and comfortable light for office work.

Piedmont Hearing Set for Dec. 9

The Interstate Commerce Commission has assigned for oral argument on Dec. 9 the application of the Piedmont & Northern Railway in Finance Docket No. 6208 for a certificate authorizing the construction of two extensions of its electric line in North and South Carolina, which is being opposed by most of the steam railroads in the territory. The commission recently made public a proposed report by Examiner H. C. Davis recommending that the application be denied. The argument is to be heard by Division 4 of the commission, Commissioners Eastman, Meyer and Woodlock. The program of the Piedmont & Northern in this connection calls for the expenditure of more than $20,000,000.

Children Operate Houston Trolleys

To play "street car" will be a novel pastime for the children of Houston, Tex. Although the motormen will not be worried about safety and the conductors anxious about the exact fare, regular, full-grown trolleys with gongs, bell cords and all intact will operate in the playgrounds of the city. The Houston Electric Company is about to discard some old cars as new ones are placed in service and after talking to the director of the recreation bureau plans to present the old equipment to the city for children's playgrounds. Besides the fun to be had while playing "street car" the cars will also serve as sort of shelter houses for playgrounds that now have none.



New Orleans may well be proud of new home of its local utility

Fare Readjustment Proposed in Galveston

Increased car fares and reduction in wholesale and retail power rates are proposed by the Galveston Electric Company to the City Commissioners. The reduction in power rates offered will amount to approximately 25 per cent and affect some 650 customers. The company does not contemplate further reductions in lighting rates at this time as reductions were made in the first part of 1927. According to the proposed street car rates regular patrons will pay 25 cents for a weekly ticket and 5 cents for each ride. Occasional riders will pay 30 cents for four tickets and the infrequent riders a 10-cent cash fare. The present fare is 6 cents.

Fare Hearing in St. Paul Deferred

Hearing of the application by the St. Paul City Railway for an increase in the rate of fare before the Minnesota Railroad and Warehouse Commission has been postponed until after Jan. 1. The first date set was Oct. 24 and the second on Nov. 1. The city desired more time from the third date set, Nov. 14. It is expected to be the contention of the company that the valuation of $16,503,557 set by the commission shows a return of only 4.64 per cent, instead of 7.5 per cent, the figure set by the commission.

Larger Welfare Plan in Virginia

A new benefit association has been formed covering the entire Virginia Electric & Power Company system and its affairs will be conducted as heretofore by a board of managers, the members of which are chosen by popular vote and hold office for a period of one year or until their successors are chosen. The old relief association formerly operated as two separate divisions for the Richmond and Petersburg and the Norfolk and Portsmouth districts of the company. The new association is a reorganization as of Sept. 1, 1927. It is conducted by and for employees to provide aid for members when incapacitated for work; to relieve distress and to promote fellowship and co-operation among members and their families. Sick and death benefits, hospital and medical attention and group insurance are provided in the larger welfare plan.

Knoxville Company Confident of Fair Treatment

Passage on first reading of an ordinance giving a franchise to the Knoxville Rapid Transit Company, Knoxville, Tenn., to operate buses on the streets of Knoxville, by the City Council, will make no changes in the plans of the Knoxville Power & Light Company to add twelve additional street cars to its service and readjust its rates for electric lights.

Announcement that the company would not cancel its order for twelve new cars given recently and would not withdraw its application for certain reductions in electric light rates pending before the State Public Utility Commission has been made by Col. C. H. Harvey, president, who is confident the Council would give fair consideration to the effect of transit competition.

Substitutions and Fare Increases Sought on Wisconsin Lines

The Marinette, Wis., Light & Traction Company, a subsidiary of H. M. Byllesby & Company, has petitioned the Wisconsin Railroad Commission for authority to curtail street car service in the city. If carried out the plan would include the abandonment of the interurban service to the city of Menominee, Mich., just across the river. Street car service between the two cities has been suspended all summer due to the fact that the two bridges across the Menominee River, which marks the Wisconsin-Michigan line, have been closed to travel and will need to be rebuilt. The matter of how much the railway company should contribute to the cost of rebuilding these bridges is pending before the commission. The company offered to substitute bus service in and between the two cities. This plan may be revived as a compromise.

The company has also asked for the right to increase fares on the proposed remaining lines in Marinette. This would mean a cash fare of 10 cents instead of the present 7-cent cash fare and three tokens for 25 cents instead of ten for 50 cents as at present. Instead of the present rule of fixing children's fares in accordance with their alleged ages, the company proposes to carry children under 40 in. in height free of charge if accompanied by a person paying fare. Children between 40 in. and 52 in. in height are to pay a 5-cent cash fare. Children over 52 in. in height are to pay the adult fare.

No-Parking Ban in Chicago Deferred Until Jan. 1

Postponement of a six weeks experiment of abolishing all parking in the downtown Loop district of Chicago during business hours of the day has been announced by Alderman Thomas Bowler, chairman of the City Council's committee on street traffic. The no-parking plan, which was adopted last month by the street traffic committee after lengthy consideration of the recommendations of Miller McClintock of Harvard University, was to have been put into effect on Nov. 15, but is now deferred for another six weeks or more by the decision of the committee. Fear that such drastic action might injure the business of downtown merchants during the holiday buying season is responsible for the committee's action.

Weekly Pass System in St. Petersburg May Be Extended

R. E. Ludwig, director of public utilities at St. Petersburg, Fla., is said to have indicated that if the sale of passes good for use on the St. Petersburg Municipal Railway is a success from the standpoints of increased patronage and satisfaction to the public, he would consider issuing a combination pass later that would be good for use on both railway lines and buses. The weekly passes are sold for $1. The proposed combination trolley-bus passes, if finally adopted, would be sold at slightly higher cost to counterbalance the difference in regular fares, which is 10 cents on the buses as against 7 cents on the electric cars.

Five-Cent Fare Cars Do Well in Seattle

The first day's receipts on the 5-cent fare line operated by the Seattle Municipal Railway, Seattle, Wash., in the downtown district were $57, the second day $74 and the third day $75. It is expected that revenues will increase with the Christmas shopping, and also will increase materially in rainy weather. The cost of operating these cars is very slight, as they are manned by trainmen running the trippers, who are guaranteed a minimum wage, but who do not put in enough time to earn this wage, and therefore are being paid for time which they are not working. Thus the time of the trainmen operating these cars costs the company nothing additional. These cars operate only from 9:30 in the morning until 4:30 in the afternoon.

The cars in use in the 5-cent service are painted a maroon and operate on First, Second and Third Avenues, from the railroad stations at the sound end of the business district to the northern end of the business district. Seattle's business district is pretty well spread out in a north and south direction, and it is thought that this 5-cent fare will pick up a number of riders who would walk rather than pay the regular 8½-cent fare. No transfers are issued on the 5-cent fare.

Kansas City Advertisement in Pamphlet Form

Samples of newspaper advertising used by the Kansas City Public Service Company, Kansas City, Mo., from June 1 to Oct. 1, 1927, have been put into booklet form. Herein is part of the regular advertising program of the company which appears regularly four times a week in the Kansas City *Star* and the Kansas City *Journal-Post*. The advertising campaign is being carried out with the idea of placing before the public, by a consistent and regular program, the mutuality of interest between the community and the transportation agency and to sell the idea of a greater use of the transportation facilities.

Foreign News

Big Express Motor-Bus Scheme at Manchester

Nine municipalities and two companies get together for first great co-ordination of tram and bus services in England

UNDER British law an English municipality ("corporation") cannot operate buses without special Parliamentary acts and, even then, restrictions will obtain as to the distances to which routes may extend beyond the city boundaries. On the other hand, it has proved extremely difficult to prevent private bus operators from entering the municipality and running such fares and services as they see fit. Usually some compromise is effected whereby the bus operator agrees to charge a higher fare along tramway routes to discourage local pick-ups, or else the tramways reduce their maximum (zone-rate) fares to a figure which buses cannot meet.



Six separate through routes at Manchester supplement trams and reach new areas

While fully determined to control all the public service transport within Manchester, the Manchester Watch Committee, through Henry Mattinson, general manager and chief engineer of the Manchester Corporation Tramways, has been working on a plan that would be fair to the city and to responsible outside communities and companies alike. This plan has now matured to the point where it is possible to announce the territory to be covered and the nature of the services. Regular express runs capable of indefinite extension will be made between Bolton and Hyde, Bury and Stockport, Heywood and Gatley, Rochdale and Altrincham, Oldham and Urmston and Stalybridge and Eccles. Each route will pass through some central part of Manchester and they will be interchangeable.

The purpose of these routes is twofold: One is to reach places beyond the tram terminals, the other is to give along the tram routes a specialized service for which the bus is better fitted than the rail-bound car under the road conditions obtaining. The nine municipalities of Manchester, Salford, Bury, Rochdale, Oldham, Ashton-under-Lyne, Heywood, Stockport and Bolton, as well as two private companies, the Stalybridge & Dukinfield Joint Board and the South Lancashire Tramways & Omnibus Company, have already come to an agreement for this joint undertaking.

Buses are to stop chiefly at the tramway fare stages, which are about ¾ mile apart. Several such services are already operated in Manchester, but Mr. Mattinson realized that their full possibilities depended upon the ability to continue as through routes into outlying territories. It should not be necessary for long-haul riders to have a change of buses en route.

The map shows that arrangements have been made for six separate through routes. While passing through Manchester, they avoid the exact center in order to by-pass the most congested district. Two special stops will be provided downtown, in addition to those at tram stages, so bus patrons may transfer from one route to another.

By the first week of November, 1927, through running rights had been obtained from all municipalities concerned except for the Statford stretch of the Rochdale-Altrincham route, but it was expected that this difficulty would soon be overcome. In several cases journeys now calling for a transfer and long waits for connections will be made without change. The initial fares will be approximately double the tramway rates in the Manchester district until experience suggests alterations.

Small British Tramway Suspends Service

In September the Redruth & Camborne Tramways, Redruth, England, ceased operation and buses are now the sole means of transportation. This tramway, which had been in operation for many years, was the only electric line in the county of Cornwall and was only 4 miles long. Abandonment was caused by bus competition. The track and rolling stock were offered as a gift to the Redruth Urban District Council, but the offer was declined. Tramway company officials expressed the belief that the time is past when the smaller tramways can be of material benefit to the public.

H. P. Stokes, the manager of the Plymouth Corporation Tramways, in commenting on this view pointed out that this was a short line in an unpopulous district and that it was a speculative venture that had never proved a success. In well-populated areas, he said, the tramcar remains the most economical vehicle for dealing with heavy traffic.

Service Increased for Theater Crowds

For the benefit of people going home from theaters, the London County Council has increased its tramcar services after 11 p.m. from five west-end terminals to provide seating accommodations for 31,500 passengers. Between 11 p.m. and midnight 255 cars, seating 18,600 passengers, leave these terminals. All-night service at longer intervals begins on the Council's tramway shortly before 1 a.m.

Co-ordinated Bus-Tram System in Glasgow

Purchase of 25 buses for the tramways department, Glasgow, Scotland, was authorized recently by the Glasgow Town Council. The new buses are to be used as auxiliaries to the tramways to extend municipal transportation services to new suburban districts. Tramway extensions to these suburbs is regarded as too costly. Previously the Glasgow Tramways has operated only a few experimental buses on a quiet route.

Improved Seats for London Street Cars

Orders for 355 upholstered spring-seats for the upper decks of street cars have just been placed by the highways committee of the London County Council. It is expected that they will all be completed by next March. One car equipped with the new seats is to be put in operation on the London traction system in the near future.

Record Tramway Traffic in Liverpool

During a "civic week" held in Liverpool, England, the last of September, tramway traffic passed all previous records. The number of passengers carried was 5,600,000. The largest number ever previously reached in a week was 5,519,000 last July, when Liverpool was visited by royalty.

Recent Bus Developments

"How, Where and Why" While En Route

An extensive and systematic drive is being made by the Illinois Traction System to popularize the McKinley Bridge at St. Louis for transcontinental and local tourists, urging the advantages of this gateway to the West and Southwest. Along the principal paved highways in Missouri and Illinois leading into St. Louis and within a radius of 60 miles of the metropolis of the Mississippi Valley are displayed well-painted highway signs directing attention to the McKinley Bridge.

A second edition of the booklet "Auto Trails Map of St. Louis" has also been issued this year, which tells in detail the saving in time and money made possible through the use of the McKinley Bridge. The tourist is also furnished a carefully prepared guide to St. Louis and auto trails map of the city and vicinity. At first this booklet was distributed through hotels, automobile clubs, direct mail and other miscellaneous sources, but more recently the railway has secured the cooperation of the principal gasoline-filling stations in St. Louis and the adjoining territory and the booklet is thus placed in the hands of the tourist while he is en route—the very best time to reach him. Each filling station is supplied with an attractive porcelain-finish sign reading: "Free map of St. Louis-McKinley Bridge Information."

Short Bus Extension in Minnesota

The Minneapolis Street Railway has been directed by the Minnesota Railroad and Warehouse Commission to run buses into Richfield, Minn., recently added to the city, covering about 1.1 miles. The new bus line will connect with the Bryant Avenue railway line.

Substitute Service in Mobile

Bus operation will be substituted by the Mobile Light & Railroad Company, Mobile, Ala., in the area served by the section of its Charleston-Beauregard line west of South Cedar Street, if an agreement reached by officials of the company and the city commission is approved by the Alabama Public Service Commission. It has been announced that the railway will proceed to withdraw its pending petition for abandonment of track and file a new petition asking for authority to abandon track on that division of the line and to establish a bus service as a substitute. Mayor Hartwell said the agreement provides for bus service to and from the Southern League field during the baseball season. Cash fares for the bus line will be 8 cents, the rate applying to the railway.

Inasmuch as the agreement to establish the bus line as a substitute service has only just been reached, the railway has not decided the number of buses to be operated or the schedule details. It was understood, however, that it will proceed at once to withdraw the present petition before the Public Service Commission and replace it with one providing for bus transportation.

Veteran Makes His Last Railway Run

John Noel, veteran trainman of the Wisconsin Public Service Corporation, ran the first car over the Duck Creek line when it was opened 25 years ago and he brought the last car in off of the line on Nov. 1, when buses replaced railway service on this 10-mile run. There were 1,400 riders on the line on the opening day 25 years ago and fewer than 300 on the closing day.



Operator of first and last runs on Duck Creek Line

Ordinance Restricting Miami Buses Reenacted

By more than four to one, citizens of Miami, Fla., voted against readmitting jitneys in competition with the railway. Not a single precinct in the city showed a majority in favor of the jitney. The present ordinance forbids the operation in the downtown section of Miami of buses that carry fewer than fifteen passengers.

The attorney for the jitney operators characterized the result of the election as a "temporary setback," saying he expected a Supreme Court decision in the next few weeks on the constitutionality of the anti-jitney law.

By Their Uniforms Ye Shall Know Them

All operators of buses of the New York State Railways, Syracuse lines, are clad in regulation uniforms of gray whipcord, with chauffeur's cap, black puttees, a khaki shirt and black four-in-hand tie. This snappy uniform, savoring of the military, will serve to distinguish the bus operators from railway motormen and conductors. Hitherto the bus and trolley men wore similar uniforms.

Shoppers Line in Minneapolis Proves Successful

The first year's operation of the Nicolet-Hennepin bus line from the heart of Minneapolis, Minn., to 36th Street by the Minneapolis Street Railway was a success. These vehicles used gas-electric motors of the no-gear shift type. In all, 1,173,571 passengers were carried from Oct. 14, 1926, to Oct. 31, 1927, returning at a 10-cent fare a gross of $117,357. This is a shoppers' line and does much intermediate haul business.

Two Fageol Twin Coaches have recently been installed on the 38th Street line, which operates at the street car rate with double transfer privilege. The type has six side seats, ten cross seats, all seating two passengers, and a rear seat for four. There are ten dome lights. Rear exit is pneumatically controlled.

Buses Patronized in Hillsboro

Three Graham Brothers buses have recently been put in service by the Illinois Power & Light Company at Hillsboro, Ill., taking the place of the recently retired street cars. Free transportation was offered the first day the buses went into service.

New Terminal in Camden Opened

The new bus terminal in Courthouse Square, Camden, N. J., was opened on Oct. 29. Its use permits South Jersey passengers to transfer to Public Service-P.R.T. buses for Philadelphia. Opening of the terminal was described as a move on the part of the Camden City Commissioners to relieve traffic conditions in South Jersey. On the day the terminal was opened the Public Service put two new buses in operation, one linking Burlington and Camden and the other running to Williamstown. Under the new transfer plan the passengers would be able to remain in Camden or to transfer to Penn-Jersey buses to Philadelphia.

NEW ROUTE APPROVED.—The Connecticut Company, New Haven, Conn., has been authorized by the Public Utilities Commission to operate a bus route in the eastern part of the city from the junction of Ferry and Lombard Streets.

Financial *and* Corporate

Federal Court Is Asked to Retain Chicago Railways Receivers

A petition asking that Frederick H. Rawson, president of the Union Trust Company, and Henry A. Blair, president of the Chicago Surface Lines, be allowed to continue as receivers of the Chicago Railways without the appointment of a third receiver, to fill the place of the late John J. Mitchell, was taken under advisement on Nov. 11 by Federal Judge James H. Wilkerson on the motion of attorneys representing interests in the foreclosure proceedings. The motion asking for the continuance in office of the two other receivers was made on behalf of the receivers and was concurred in by attorneys for the bondholders' protective committee.

Increase in Brooklyn-Manhattan Net Income

An increase of $600,257 in the consolidated net income was realized by the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., for the fiscal year ended June 30, 1927. In the fourth annual report, just issued, it is stated that the gross income as shown was after providing for all maintenance charges, taxes and reserves for depreciation.

During the last two years the expenditures for maintenance of way and structure and of equipment, including reserves for depreciation, have totaled $22,429,270, which is 24.50 per cent of the total operating revenues of $91,551,560 for the two years.

On the outstanding preferred stock, four quarterly dividends were paid, aggregating $1,496,808, and on the outstanding common stock four quarterly dividends of $1 each were paid, aggregating $3,079,644.

The accompanying table showing passengers carried indicates that the increase in nine years in passengers on the rapid transit lines has been 148.03 per cent, and the increase on the system 78.2 per cent. It will also be noted that the surface lines carried nearly 270,000,000 passengers in 1927, which is about 50 per cent of the total surface traffic in Brooklyn.

On the subject of rapid transit the report states the city has now nearly completed the Fourteenth Street-Eastern line, the construction of shops and storage tracks near Coney Island and the lengthening of certain station platforms to accommodate eight-car trains. In anticipation of requirements for additional equipment the rapid transit operating subsidiary, New York Rapid Transit Corporation, purchased 213 cars, comprising 71 units of triplex articulated cars, which were equipped in the Coney Island shops and are now largely in use. The city has not yet started work on the construction of the Nassau-Broad line. This line, with the added facilities mentioned above, would materially increase the capacity and efficiency of the rapid transit lines under Contract No. 4.

The condensed comparative summary for the fiscal year ended June 30, 1927, and for the fourteen-year period from the commencement of operation under Contract No. 4, namely, Aug. 4, 1913, to June 30, 1927, shows the order in which such deductions are made from revenues and the application of revenues thereto, together with the cumulative deficiencies. It will be observed that the earnings for 1927 showed an excess over the year's deductions, applicable to the cumulative deficiency. The report states that with a continuation of favorable operating conditions and particularly with the additional facilities that the city is obligated to provide, it is hoped that the net revenue will continue to increase so that the cumulative deficiency of full deductions may be gradually made good.

COMPARATIVE INCOME STATEMENT OF THE BROOKLYN-MANHATTAN TRANSIT CORPORATION

	1927	1926
Total operating revenue	$46,710,592	$44,840,967
Total operating expenses, including depreciation	30,388,173	29,220,839
Net operating revenue	$16,322,418	$15,620,127
Taxes paid and accrued on operating properties, including contingent reserves for federal income taxes	3,250,896	3,260,384
Operating income	$13,071,522	$12,359,742
Net non-operating income	1,071,783	1,180,492
Gross income	$14,143,305	$13,540,235
Income deductions—Interest and rentals	7,789,025	7,777,877
Balance	$6,354,280	$5,762,358
Less—amount accruing to minority interests	5,834	14,171
Net income	$6,348,445	$5,748,187

PASSENGERS CARRIED

Fiscal Year	Surface	Rapid Transit	Totals
1918	255,569,584	265,400,020	520,969,604
1919	251,893,227	313,933,642	565,826,869
1920	278,832,742	380,190,890	659,023,632
1921	223,006,425	406,695,310	629,701,735
1922	250,412,364	446,384,508	696,796,872
1923	262,992,795	482,584,090	745,576,885
1924	266,421,409	539,069,076	805,490,485
1925	271,800,914	593,368,990	865,169,904
1926	269,233,866	623,099,695	892,333,561
1927	269,928,710	658,271,663	928,200,373

CONDENSED COMPARATIVE SUMMARY OF BROOKLYN-MANHATTAN TRANSIT CORPORATION OPERATION

	Year Ended June 30, 1927	Period Aug. 4, 1913, to June 30, 1927
Revenue	$34,155,938	$281,004,142
Operating deductions and corporation's first preferential	26,557,032	250,935,856
Balance available for return on new money invested under contract	7,598,906	30,068,286
Corporation's second preferential representing interest and sinking fund on corporation's contribution to construction and equipment under contract	5,470,623	45,585,174
Balance above corporation's second preferential	2,128,282	.....
Deficiency, representing amount by which revenue failed to equal interest and sinking fund on corporation's contribution to construction and equipment under contract	.....	*15,516,688

*Indicates decrease.

Change in Name at Wilmington

Stockholders of the Wilmington & Philadelphia Traction Company, Wilmington, Del., took action on Nov. 15 and changed the name of the company to the Delaware Electric Power Company. As the business is conducted largely in Delaware, with no operations in Philadelphia, and as the old name gives no indication of the company's large and growing electric light and power department, which serves approximately 70 per cent of the population of the state, it was deemed advisable to select a new name which would more clearly indicate the character and location of the company's combined business. Its general office, as heretofore, is located at 834 Market Street, Wilmington. T. W. Wilson is president of the company.

Delay Expected in Washington Merger Plan

Hearings on the District of Columbia traction merger plan will probably be delayed for several weeks. Harley P. Wilson, capitalist, who has been actively engaged working out a merger plan, informed a representative of the ELECTRIC RAILWAY JOURNAL, because he has decided on a series of conferences with himself and the presidents of the two companies in order to iron out some of the difficulties that have arisen. Meanwhile the firm of Charles Hansel, utility consulting specialists, is working out a plan for the consolidated operation of the street railway properties on behalf of the Federation of Citizens Associations. This latter plan, according to the statement of Col. Eugene Abadie of the firm, deals more with the technical phases of consolidated operation rather than with the financial side.

Another angle has been introduced by the proposal of William McKinley Clayton of the Federation of Citizens Associations to operate a "co-operative bus service," the necessary capital for which enterprise is to be raised by subscription among members of the various citizens' associations. Mr. Clayton believes that the street railway companies have no provision in their charters to allow their operation of buses and feels that this co-operative bus line would force the companies to effect a merger to the advantage of the citizens. Leon Arnold, who operates several bus lines between

Washington and Virginian points and who was the former proprietor of the Washington Rapid Transit Company, is also in favor of this co-operative bus service proposal.

Mr. Wilson, in answer to a question as to what effect the merger would have on the purchase of new equipment, said his plan contemplated the properties as they were and what might be done with them afterward was a matter for the trustees to determine. He brought out that Washington's position as a reservation of the federal government caused some unusual problems in legislation affecting its utilities, and particularly in the matter of this merger an extra element was introduced because the necessary legislation had to be enacted by Congress. "No city has any business having competing transportation systems," Mr. Wilson said. "This merger business in Washington has been talked of for the last twenty years and now the time for accomplishment has come." However, he did not want to create the impression that he was seeking to force a merger.

John H. Hanna, president of the Capital Traction Company, stated that he had been for years in favor of some sort of service-at-cost plan.

ERNEST ISELIN A THIRD AVENUE DIRECTOR.—At the annual meeting of the stockholders of the Third Avenue Railway, New York, Ernest Iselin was elected a director, succeeding his father, Adrian Iselin, resigned. Other directors were re-elected.

Financial Readjustment in Helena

Utility properties in Montana city segregated under management of J. G. White & Company

AS OF Nov. 30 conversion rights will expire in connection with the financial readjustment of the utility properties at Helena, Mont. After the acquisition of the properties there by the two new corporations organized to hold them and the acquisition by J. G. White & Company, Inc., of the stock of the Helena Gas & Electric Company, J. G. White & Company, Inc., offered to depositors with the stockholders' committee of the old Helena Light & Railway Company the right to purchase from J. G. White & Company, Inc., each six shares of common stock deposited, at the same price per unit. It is this offer that expires on Nov. 30.

The properties formerly owned by the Helena Light & Railway Company were purchased at foreclosure sale by a representative of the bondholders' committee for and in behalf of that committee. Pursuant to a contract of purchase entered into between the bondholders' committee and J. G. White & Company, Inc., the electric and gas properties were segregated from the railway properties and the former properties were transferred to the Helena Gas & Electric Company, a new Delaware corporation, and the latter properties to the Helena Electric Railway, also a new Delaware corporation. Both of these companies are in operation.

First mortgage 6 per cent bonds due 1947, secured by mortgage to the Hanover National Bank, New York, trustee, dated as of Jan. 1, 1927, mortgaging the properties of the Helena Gas & Electric Company, including a pledge of all the outstanding stock of the Helena Electric Railway, consisting of 1,000 shares without nominal or par value	$750,000
$7 dividend cumulative preferred stock without par value, shares	2,805
Common stock without par value, shares	6,000

stock on the following basis: To depositors of preferred stock a unit consisting of one share of preferred stock and two shares of common stock of the Helena Gas & Electric Company for each two shares of preferred stock deposited, upon payment of $87.50 and accrued dividend for each unit. To depositors of common stock a unit consisting of one share of preferred stock and two shares of common stock of the Helena Gas & Electric Company for

All of the stock of the Helena Electric Railway is held by the Helena Gas & Electric Company and all of the outstanding stock of the Helena Gas & Electric Company was issued to J. G. White & Company, Inc. J. G. White & Company., Inc., paid the bondholders' committee for the properties by delivering new first mortgage 6 per cent bonds of the Helena Gas & Electric Company at par equal to 60 per cent of the principal amount of the old bonds held by the committee, and by paying cash equal in the aggregate to the remaining 40 per cent of the principal amount of the old bonds, plus accrued interest and a number of other charges and expenses. The outstanding capitalization of the Helena Gas & Electric Company is shown in the accompanying statement.

The final disposition of the Helena Electric Railway apparently remains in doubt. It is stated that the management may discontinue railway service in the near future and sell or liquidate the Helena Electric Railway.

Compiled for Publication in This Paper by

Conspectus of Indexes for November, 1927

ALBERT S. RICHEY
Electric Railway Engineer, Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Street Railway Fares* 1913 = 4.84	Nov. 1927 **7.56**	Oct. 1927 **7.54**	Nov. 1926 **7.42**	Nov. 1927 **7.56**	May 1923 **6.88**
Electric Railway Materials* 1913 = 100	Nov. 1927 **141.8**	Oct. 1927 **142.1**	Nov. 1926 **156.6**	Sept. 1920 **247.5**	Sept. 1927 **141.6**
Electric Railway Wages* 1913 = 100	Nov. 1927 **228.3**	Oct. 1927 **228.2**	Nov. 1926 **226.3**	Sept. 1920 **232**	March 1923 **206.8**
Am. Elec. Ry. Assn. Construction Cost (Elec. Ry.) 1913 = 100	Nov. 1927 **198.9**	Oct. 1927 **199.2**	Nov. 1926 **203.7**	July 1920 **256.4**	May 1922 **167.4**
Eng. News-Record Construction Cost (General) 1913 = 100	Nov. 1927 **202.0**	Oct. 1927 **204.4**	Nov. 1926 **210.8**	June 1920 **273.8**	March 1922 **162.0**
U. S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	Oct. 1927 **146.5**	Sept. 1927 **145.7**	Oct. 1926 **149.7**	May 1920 **246.7**	Jan. 1922 **138.3**
Bradstreet Wholesale Commodities 1913 = 9.21	Nov. 1 1927 **13.39**	Oct. 1 1927 **13.26**	Nov. 1 1926 **12.74**	Feb. 1 1920 **20.87**	June 1 1921 **10.62**
U. S. Bur. Lab. Stat. Retail Food 1913 = 100	Oct. 1927 **156.1**	Sept. 1927 **154.0**	Oct. 1926 **160.0**	July 1920 **219.2**	March 1922 **138.7**
Nat. Ind. Conf. Bd. Cost of Living 1914 = 100	Oct. 1927 **163.7**	Sept. 1927 **162.8**	Oct. 1926 **167.2**	July 1920 **204.5**	Aug. 1922 **154.5**
Steel Unfilled Orders (Million Tons) 1913 = 5.91	Oct. 31 1927 **3.341**	Sept. 30 1927 **3.148**	Oct. 31 1926 **3.684**	July 31 1920 **11.118**	May 31 1927 **3.051**
Bank Clearings Outside N. Y. City (Billions)	Oct. 1927 **19.97**	Sept. 1927 **18.62**	Oct. 1926 **19.83**	Oct. 1925 **20.47**	Feb. 1921 **10.43**
Business Failures Number	Oct. 1927 1474	Sept. 1927 1417	Oct. 1926 1420	Jan. 1924 2231	Aug. 1925 1353
Liabilities (Millions)	**33.67**	**52.65**	**39.82**	**122.95**	**27.22**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population. Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen, conductors and operators on 136 of the largest street and interurban railways operated in the United States, weighted according to the number of such men employed on these roads.

Short Abandonments in New York Sought

The Empire State Railroad Corporation petitioned the Public Service Commission recently for approval of a declaration of abandonment of sections of the Clark Street line in the city of Auburn, N. Y. It also sought a declaration of abandonment of a part of the line in Fulton, Oswego County, for a distance of 0.55 mile. These lines, the company alleged, were no longer necessary for the convenience of the public.

Discontinuance in Walnut Ridge

The Walnut Ridge, Ark., City Council has adopted a resolution permitting the Arkansas-Missouri Power Company

to discontinue operations of the electric railway in Walnut Ridge.

The railway has been operating only in Walnut Ridge since the municipal authorities of Hoxie served notice on the company in August, ordering it to discontinue operations in Hoxie. After six weeks the company took up the tracks in Hoxie. The controversy between Hoxie and the company came up over the extension of the tracks in that city and summary action was taken when the Hoxie authorities barricaded the tracks on the expiration of time given the company to extend the tracks and service.

Data on Stock and Borrowed Money in California

For the year ended June 30, 1927, the California Railroad Commission authorized $1,500,000 in electric railway issues. This compares with $4,362,461 in 1926 and $3,515,496 for the year ended June 30, 1925.

In commenting on this the commission stated that in the last three years there appeared to be a tendency among the utilities to finance their construction to a greater extent through stock issues. This seemed to be caused, in the early part of the period, by the inability of some companies to have bonds certified, due to decreased earnings resulting from water shortage, and in the latter part by the policy, on the part of some, to even the ratio between the outstanding stock and bonds.

Since the effective date of the public utilities act on March 23, 1912, up to June 30, 1927, the commission has authorized the issue, for additions to and betterments of properties, of securities in the total amount of $1,380,923,997, of which $596,563,245, or about 43 per cent, has been represented by stock and $683,360,752, or about 57 per cent, by borrowed money.

Insulls After Western United

A controlling interest in the Western United Gas & Electric Corporation, which operates electric, gas and local and interurban transportation services in suburban territory adjacent to Chicago, is reported to have been acquired on Nov. 19 by Samuel Insull and associates of Chicago. The Western United properties, representing an investment of approximately $32,000,000 in utility services in about 70 communities, were controlled by Col. Ira J. Copley, who has resigned as president.

About two years ago a large share of the stock passed into the hands of A. E. Fitkin & Company, but was recently disposed of to E. H. Rollins & Sons Company, Chicago investment bankers, from whom the Insull interests are said to have just purchased control. The Western United Corporation operates the local railway lines in the cities of Aurora and Elgin, Ill., and through the Aurora, Elgin & Fox River Electric Company the interurban lines connecting these two points.

Personal Items

Omaha Awaits J. N. Shannahan

Public utility operator and former A.E.R.A. president becomes president of the Omaha & Council Bluffs Street Railway

THERE are always rejoicings in his arrivals and regrets in his departures—the former induced by the story of his accomplishments and conduct and the latter because acquaintance with his character satisfies a physical and mental need. While Newport News and its environs bemoan the fact that John N. Shannahan will no longer be counted among their citizens, Omaha avidly awaits his coming on Dec. 1, for upon his shoulders will fall a large part of the responsibility for



J. N. Shannahan

lifting up a company weighed down with financial burdens and franchise difficulties. Similar difficulties have been surmounted by him in the past, notably at Newport News, where he was president and principal owner of the Newport News & Hampton Railway, Gas & Electric Company until early in 1926, when the former president of the American Electric Railway Association concluded a deal in which control of that property passed to the Fitkin interests. Since then Newport News has been watching Mr. Shannahan's efforts in the development of large real estate holdings of the Old Dominion Land Company. It was generally felt, however, that the 55-year-old executive was endowed with too much vitality and genius to divorce himself from some public service enterprise. His recent election as president and general executive of the Omaha & Council Bluffs Street Railway substantiates this view.

The details of Mr. Shannahan's steam railroad experiences, electric railway accomplishments and American Electric Railway Association activities are familiar to readers of the ELECTRIC RAILWAY JOURNAL and to the utility field in general. Let it suffice to say that his first knowledge of railroading was gained during his summer student vacations by working as a locomotive fireman on the Delaware & Hudson Railroad. After he was graduated he served in various capacities with the New York Central & Hudson River Railroad. It was in this territory, namely, Troy, N. Y., that Mr. Shannahan, born in August, 1872, received his preparatory education at the Troy Academy, a degree of civil engineering from the Rensselaer Polytechnic Institute in April, 1894, and laid the foundation for a public utility career which was no more conspicuous for its attainments in community progress than for the influence it wielded as the moving spirit of fairness and generosity, integrity and loyalty.

His services in the operating department of J. G. White & Company, as vice-president and general manager of the Washington, Baltimore & Annapolis Electric Railway and with the Fonda, Johnstown & Gloversville Railroad all helped to increase his fund of knowledge, to develop his powers of observation and judgment and to whet his appetite for the tastes of the men with whom he came in contact, whether they were responsible to him or he to them.

The real market for his talents opened up in 1912, when he took over the management of the Newport News & Hampton Railway, Gas & Electric Company and successfully conquered certain endemic hazards.

When the sale of the Hampton property was announced early in 1926 it was said that Mr. Shannahan would continue to remain head of Shannahan-Cherry, Inc., public utility operators. Somehow the disappointment over the transfer of this property felt by local communities was mitigated by the fact that Mr. Shannahan was still to stay in the railway industry. The commendatory comments of the press at that time gave evidence of his success as a public relations man, and in unmistakable terms indicated how deeply he had intrenched himself in the affections of the Virginians.

Fred Hamilton, Omaha banker, has retired as president of the Omaha company, but will remain chairman of the board, while R. A. Leussler continues as vice-president and general manager under the new president.

Commissioner Hall to Withdraw from I. C. C.

Commissioners Meyer and Hall of the Interstate Commerce Commission conferred separately with President Coolidge at the White House on Nov. 10 at the request of the President. Commis-

sioner Hall said afterward that he had advised the President some time ago of his desire to retire from the commission but that he did not expect to leave until his own docket was cleaned up because the commission is burdened with an unusually large amount of work, and that the date had not been determined.

JOHN A. MATTHEWS, assistant in the engineering department of the Altoona & Logan Valley Electric Railway, Altoona, Pa., was recently named engineer in charge of maintenance and construction. Mr. Matthews, a graduate of Penn State, entered the engineering department of the Altoona & Logan Valley Electric Railway in 1919, being assistant to former Engineer Frank D. Hain and to Engineer Brubaker. The new incumbent of this post succeeds G. S. W. Brubaker, who went to Altoona in 1926 to take charge of rebuilding operations under direction of the General Engineering & Management Corporation, New York, operator of the line. The company expended a total of $533,435 in new track construction, rebuilding several lines and sections of other lines. He resigned to enter a business partnership.

DILLARD W. LAYNE has become general agent of the Pacific Electric Railway with office at Long Beach, Cal. Mr. Layne has been with the railway since 1899. For the past six years he has been traveling freight agent for the Pacific Electric Railway, but most of his time with the company has been spent in the northern division. In his new position he will have entire charge of the traffic end of the business. Mr. Layne succeeds Willis R. Osborn, who did that work for the past seven years. He goes to Huntington Beach as agent.

WILLIAM STOKES has replaced John C. Mellett as head of the Indiana Public Utility Association and the Indiana Committee on Public Utility Information. The office of these bodies is located at 1547 Consolidated Building, Indianapolis, Ind.

IRA H. ROWELL, a resident of Berkeley, has been appointed an examiner of the California Railroad Commission to succeed Reginald L. Vaughan, who has been appointed assistant attorney of the commission. Mr. Rowell has been practicing law in San Francisco since 1923, when he was given the degree of doctor of laws by the University of California. He was formerly a resident of Fresno, and for ten years was associated with the Fresno *Republican*.

GEORGE H. CONKLIN, director of public relations of the Augusta-Aiken Railway & Electric Corporation, Augusta, Ga., was elected secretary and treasurer of the North and South Carolina Utilities Information Committee at the recent annual meeting of that organization held in Charlotte, N. C. In this capacity he succeeds Raymond Hunt, vice-president of the Tidewater Light & Power Company, Wilmington.

R. F. Carbutt Honored

Doherty operating executive elected to head Metropolitan Section of the A.E.R.A.

ROBERT FOSTER CARBUTT, on the operating staff of the public utility division of Henry L. Doherty & Company, New York, since 1909, has been elected president of the Metropolitan Section of the American Electric Railway Association. Mr. Carbutt's range of activities with the Doherty organization is very wide since he is in charge of the supervision of electric railway and bus operation of subsidiary properties controlled by that company and acts as examining engineer on new projects and in an advisory capacity in the administration of the personnel of the subsidiary utility properties.

Mr. Carbutt was born in Philadelphia on Oct. 12, 1878. He was graduated with the degree of B. S. in electrical engineering from the University of Pennsylvania in 1901. From 1901 to 1903 he was engineer of the Keystone



R. F. Carbutt

Company, Philadelphia. In 1903 and 1904 he was manager of the St. Petersburg Railway & Electric Company, St. Petersburg, Fla. In 1904 and 1905 he was engineer on construction work on the Rochester, Syracuse & Eastern Railroad for J. B. White & Company. For the same company he served on the operating force of the Eastern Pennsylvania Railway at Tamaqua, Pa. This was during 1905 and 1906. From 1907 to 1909 Mr. Carbutt was manager and chief engineer of the Southern Public Service Company, Washington, D. C. Since then, as previously noted, he has been connected with Henry L. Doherty & Company.

In the past few years, particularly since 1924, Mr. Carbutt has been active in affairs of the American Electric Railway Association. In 1924 he was regional vice-chairman of the committees on city operation, company and associate membership. In 1925 he was vice-chairman of the committee on management and operation, and an alternate of the American committee on inductive co-ordination. In 1926 he was chairman of the committee on management and operation and in 1927 was vice-chairman of the committee on co-operation with state and sectional associations.

OBITUARY

Charles S. Mellen

Charles S. Mellen, formerly president of the New York, New Haven & Hartford Railroad and the Boston & Maine Railroad, died at Concord, N. H., on Nov. 17. Mr. Mellen had been retired from active railroad work for a number of years.

With the Morgan power behind him, Mr. Mellen launched sweeping plans for the New Haven, asserting that monopoly was best for New England transportation. So vigorously did he carry on that he won for himself the appellation "Shirtsleeves" Mellen. In the next ten years the New Haven absorbed electric railways in both Connecticut and Massachusetts and outside land and water competition to the extent of more than $200,000,000. The program of the management provoked a public storm. Courts, legislators and the Interstate Commerce Commission arose to challenge Mr. Mellen and his associates in their course. Mr. Morgan died at this critical time and Mr. Mellen passed into retirement in 1913.

In the program of expansion upon which the New Haven Railroad entered under Mr. Mellen that company did only what other similar carriers had done or were doing, but public disapprobation seemed to center about him. It would appear that the more mature judgment of E. J. Pearson, now president of the New Haven, is much more nearly correct than was the hasty judgment passed upon his acts during the turmoil that attended the investigation of the New Haven under Mr. Mellen. This does not mean that there was not room for honest differences of opinion over the appraisal of his acts, but the judgment passed by Mr. Pearson seems to be fair that as "the circle of time passes, the excellence of Mr. Mellen's work on and plans for not only the New Haven Railroad but New England are understood more clearly and better appreciated. His foresight was in the right direction." Although he did not always get credit for having it, Mr. Mellen was endowed with a keen appreciation of the ridiculous, and those who knew him well realized that during the period of his retirement he was able to look back over the events of the past with a charitable eye.

Born at Lowell, Mass., Aug. 16, 1851, Mr. Mellen at eighteen chose a $25 a month clerkship with the Northern New Hampshire Railroad, in preference to college.

JOSEPH R. ROACH, assistant interurban superintendent of the Portland Electric Power Company, Portland, Ore., died recently. He had been with the company for 26 years.

Manufactures and the Markets

Minneapolis' 25 New Units to Go Into Service Dec. 1

Twenty-five new street cars of the most modern type in street railway equipment it is reported will be put in service in Minneapolis and St. Paul, Minn., Dec. 1 by the Twin City Rapid Transit Company. Mention of these cars was made in the JOURNAL March 12 and Sept. 24.

The cars, which are now under construction at the company's plant at University and Snelling Avenues, will cost $300,000. They will be the first of a number which, it is understood, will be used to replace the present cars and each of them will seat 50 persons, 28 of them on cross-wise seats and the balance on the side seats. The cars will be light in weight and attention has been given to reduction of noise. They can be operated either as one-man or two-man type cars. The bodies are lower than the cars now in use; they have a long, rakish appearance, due to the rounding of both the front and rear ends, and have stream lines. The frames are constructed of steel and duraluminum and the sides of wood. The reason wood instead of steel was employed, according to W. J. Smith, master mechanic of the street railway company, is because of its lighter weight, minimum of vibration and insulation qualities for keeping out both heat and cold. The seats are built on more of a slant than those now commonly in use and it is claimed are more comfortable and provide greater legroom for the passengers. The rear of the seat is protected by an aluminum piece to prevent soiling of the passengers' clothing by the feet of those seated in the back. The cars are heated by electric heaters and are so designed as to provide increased light for reading and reduce the glare and shadow to a minimum.

"The company has not yet determined just what lines the cars will be operated over, but it is quite certain that they will be divided between Minneapolis and St. Paul," Mr. Smith said. "In designing these cars we have striven to make a practical, safe car which would include beauty of design and such refinements as would attract passengers and make them feel just as much at home in our cars as they would in their own automobiles."

200 Perey Turnstiles Ordered for B.-M. T.

An order for 200 Coinpassors, non-electrical, coin-controlled turnstiles, has been placed with the Perey Manufacturing Company, New York, N. Y., by the Brooklyn-Manhattan Transit Corporation. The machines were described on page 831 of the Oct. 29 issue of the JOURNAL. They are also being used by the Philadelphia Rapid Transit Company, Public Service Railway of New Jersey, the city of New York at its ferry terminals and in the Grand Central Terminal, New York City, and the South Station, Boston.

Big 1928 Improvement Program for Railway Agreed On

An improvement program for 1928 involving the relaying of 142,000 lineal feet of railway track at a cost aggregating $1,300,000 has been agreed upon by the Cincinnati Street Railway, Cincinnati, Ohio, and the City Council committee on highways. The tracks will be rebuilt in conjunction with the improvement of 29 streets by the city. Walter A. Draper, president of the railway, said that the sum involved represents three times as much reconstruction work within a year as the company is compelled to do under the provisions of its new franchise. In order to carry out the program it is understood the Council will have to pass an ordinance now pending before it to permit the street railway company to borrow the money necessary to pay for the improvements. The amount would be repaid from the company's revenue.

V. E. & P. Double Tracking Bay Shore Line

The first actual construction work that is to play a part in the Ocean View, Va., development, destined to cost $2,000,000, is under way with forces of the Virginia Electric & Power Company engaged in double-tracking the Bay Shore line of the Norfolk division, with a view to a complete rearrangement of its Ocean View service, it is reported, as the basis for that resort's development. Mention of the project and the appropriation was made in the JOURNAL, Sept. 24.

It is understood that double-tracking the Bay Shore line has been a bone of contention between the people of Ocean View and the traction company for more than a decade and that at one time it was virtually written into an agreement with the city, and on many occasions has been the basis for bitter controversy. The present owners of the company placed this project on their regular expansion program and have just reached it on the schedule.

The City Council has approved a plan to exchange with the company a portion of the right-of-way of Granby Street from the Cottage toll road intersection at Lenox through to Ocean View proper, to enable the company to straighten its tracks at Lenox and to run down the middle of the boulevard. It gives up its present right-of-way on the west side of the concrete boulevard and makes it possible now for the street to be built with a double roadway from Lenox to the water. Otto Wells of Norfolk recently, it is reported, purchased practically all of the traction company property at the resort. Engineers of the city, traction company and of the Wells organization just now are at work on the final lines of the layout of trackage, street car stations and related facilities at Ocean View. Working in conjunction with this plan is City Manager Truxton of Norfolk.

Thomas P. Walker, vice-president of the Virginia Electric & Power Company, in charge of Portsmouth and Norfolk operations, with W. Jennings Crocker, local counsel for the company, conferred recently with City Manager Hanrahan of Portsmouth, Va., relative to the company's plans to remove abandoned tracks and replace pavement so destroyed. The company has completed similar work on Elm Avenue and several other streets and plans to start early next year on Court Street, between High and London Streets. The company is making rapid progress with its work on County Street, where the concrete pavement is being repaired and put in excellent condition.

Two-Million Dollar Car Order Placed by B.-M.T.

The Brooklyn-Manhattan Transit Corporation has placed an order for 50 triplex car units—equal to 150 single cars—amounting to $2,000,000, with the Pressed Steel Car Company, according to reports this week.

The total cost of the cars will be brought up to $4,000,000 after the motors, running gears and other equipment are purchased and installed. These cars are essentially the same as the 71 triplex units already in use by the company. The new order for 50 units when completed will bring the total number of this type equipment on the B.-M.T. up to 121. This is the second large order placed by it within the last two years.

Dallas Railway Completes Difficult Job

The Dallas Railway & Terminal Company, Dallas, Tex., has completed the work of rebuilding its tracks on Main Street and on Exposition Avenue, one of the major items in what is known as Everman Plan No. 4. A total of 4,880 ft. of double track line was rebuilt and concrete paving laid between the rails, at a cost of $89,790. During construction period cars using the Main Street line were routed down Commerce Street, which parallels Main Street and is only one block removed. Richard Meriwether, vice-president and general manager of the railway, said:

The rebuilding of the double tracks on Main Street and the laying of concrete paving between the rails presented many difficulties. Main Street carries very heavy traffic. Quick work and very little inter-

ference with business along this street was necessary. The work was completed in 32 working days. Construction crews were organized into two shifts, which worked from 6 a.m. to 12:30 a.m. Three hundred men were employed on the two shifts. Our crews were instructed to keep the sides of the streets along the new construction work clear of débris, so that it was always possible to get into and out of the business houses along the street. At street intersections we used 50 per cent more cement than on other portions of the paving so the cross streets could be opened to traffic in shorter time.

The Main Street job required ten railroad cars of new 6-in. 100-lb. T-rail, ten carloads of new ties, one carload of tie plates, nearly 250 carloads of concrete, gravel and sand, which did not include the ballast salvaged from the torn-out old work. Ten street railway work trains were constantly employed.

Non-Ferrous Metals Have Good Week

Business is well up to the average in volume of sales and firmer prices were reported for all of the major non-ferrous metals in the week ended Nov. 23. Copper is up ¼ cent to 13.75 cents delivered; zinc advanced to 5.85 cents, an improvement of fifteen points; tin made a net gain of more than ½ cent, and lead is quotably a little higher in St. Louis.

An excellent business was done in domestic copper on Nov. 17, 18 and 19, with 13.625 cents in Connecticut and 13.75 cents for the Middle West destinations the prevailing prices. By Nov. 21 all of the sellers had advanced their price to the basis of 13.75 cents, Valley. The exporter's price was advanced to 14.05 cents, c.i.f., on Nov. 21.

A premium of from five to ten points for future zinc over the prices for spot and prompt metal has existed most of the week. High grade is quoted, nominally, at 7.75 cents for spot lots in New York.

Demand for lead has been excellent all week. In the East the American Smelting & Refining Company has made no change in its contract price of 6.25 cents, New York. In the Middle West, sellers found the demand sufficient to justify them in advancing prices above the 6-cent level.

The stronger tone in tin in London has brought both dealers and consumers into the domestic market. Spot and forward have sold at approximately the same prices most of the week, and 99 per cent grade has been but little below the price of Straits.

METAL, COAL AND MATERIAL PRICES
F. O. B. REFINERY

Metals—New York	Nov. 22, 1927
Copper, electrolytic, cents per lb.	13.50
Copper wire, cents per lb.	15.25-15.50
Lead, cents per lb.	6.25
Zinc, cents per lb.	5.90
Tin, Straits, cents per lb.	58.25
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.075
Somerset mine run, Boston, net tons	1.85
Pittsburgh mine run, Pittsburgh, net tons	1.825
Franklin, Ill., screenings, Chicago, net tons	1.55
Central, Ill., screenings, Chicago, net tons	1.125
Kansas screenings, Kansas City, net tons	2.30
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	5.50
Weatherproof wire base, N.Y., cents per lb.	16.00
Cement, Chicago net prices, without bags	2.05
Linseed oil (5-bbl. lots), N. Y., cents per lb.	10.5
White lead in oil (100-lb. keg), N. Y., cents per lb.	13.25
Turpentine (bbl. lots), N. Y., per gal.	$0.5450

Prices Considered of Interest to Industry Reprinted

From a table of commodity prices in a recent issue of the *Guaranty Survey*, published monthly by the Guaranty Trust Company of New York, prices considered of special interest to the industry on commodities, some of which are not given in our weekly tables, have been selected and are presented on this page (see table below). Pre-war prices, 1920, 1926 and 1927 are given.

ROLLING STOCK

Twin City Motor Bus Company, subsidiary of the Twin City Rapid Transit Company, Minneapolis, Minn., has received two new street car type motor buses which it was recently announced would be put in operation shortly.

Shore Line Motor Coach Company, Chicago, has recently accepted delivery of a Model 54 White six-cylinder bus for use between Detroit and South Bend in co-ordination with the electric line of the Chicago, South Shore & South Bend Railway between Chicago and South Bend. This bus is the "Golden Arrow," which was included in the White Company's exhibit at the American Electric Railway Association convention in Cleveland.

TRADE NOTES

W. L. Hichens has been appointed chairman of the English Electric Company, in succession to P. J. Pybus, who has resigned in order to undertake other work. Mr. Pybus will remain a director of the company.

Wade Engineering Company, Los Angeles, Cal., which handles products of the Lincoln Electric Company, Cleveland, Ohio, announces that its Northern office has been moved from 69 Webster Street, Oakland, to 533-539 Market Street, San Francisco.

American Hammered Piston Ring Company has recently placed on the market an auto engine valve tester, called the Arico, which the manufacturer says is both inexpensive and very practical. It comprises a steel collar or socket in which is affixed a strong rubber bulb in the shape of a half ball. The testing operation, it is said, consists of placing the tester over the valve opening and that the pressure of a thumb or finger tells the story.

ADVERTISING LITERATURE

Met-L-Wood Corporation, Chicago, has mailed an illustrated booklet featuring the construction and use of Met-L-Wood panels.

The J. G. Brill Company, Philadelphia, Pa., has recently issued leaflet No. 318 and bulletin No. 319, descriptive of a new automatic slack adjuster (mechanical), and the Brill 1928 model electric car and Brill No. 277-ex type truck, respectively.

General Electric Company, Schenectady, N. Y., has issued looseleaf bulletins GEA-164-B and GEA-817, describing type R.P. metal-melting pots and equipment for metal melting pots, and battery-charging equipment.

Trend of Commodity Prices Affecting the Electric Railway Industry*

	1913 Average	1920 Average	1926 Average	October, 1926	September, 1927	October 1927
COTTON—Middling, New Orleans, per pound	0.127	0.330	0.168	0.128	0.210	0.211
WOOL—Ohio, fine delaine, unwashed, Boston, per pound	0.239	0.752	0.468	0.460	0.455	0.460
SILK—Japan, Kansai best No. 1 to extra, New York, per pound	3.64	8.64	6.14	6.09	5.10	4.90
COAL—Pocahontas, mine run, Norfolk, per long ton	3.00	6.28	5.42	7.37	4.32	4.17
PETROLEUM—Kansas-Oklahoma, 33-34.9° gravity, at wells, per barrel	0.93	3.40	1.89	2.05	1.23	1.23
PIG IRON— *Iron Age* composite price, per gross ton	14.68	42.76	20.26	19.69	18.00	17.84
STEEL—*Iron Age* composite price, per pound	0.0166	0.0367	0.0244	0.0245	0.0237	0.0231
COPPER—Electrolytic, New York, per pound	0.155	0.175	0.139	0.141	0.132	0.133
SULPHURIC ACID—66 deg., in tanks, New York, per pound	0.0100	0.0109	0.0076	0.0078	0.0078	0.0078
PAPER—Wrapping, manila, No. 1 jute, New York, per pound	0.049	0.147	0.110	0.091	0.092	0.092
RUBBER—Crude, ribbed smoked sheets, New York, per pound	0.820	0.363	0.486	0.427	0.342	0.341

Current quotations are as of the 15th of the month, or the nearest available date.
* Compiled from the *Guaranty Survey*.

It's poor policy to play with substitutes



THE sole justification for offering a substitute is the desire on the part of the seller to gain his own advantage. "Just as good" means not superior. It is a poor policy to accept substitutes.

Peacock Staffless Brakes are recognized throughout the country as true emergency brakes—the one final, infallible agency to bring a car under control. We are always ready with facts and figures to show cost of installation and maintenance. Compare Peacock Staffless records with those of substitutes. Then—the decision is a safe one.



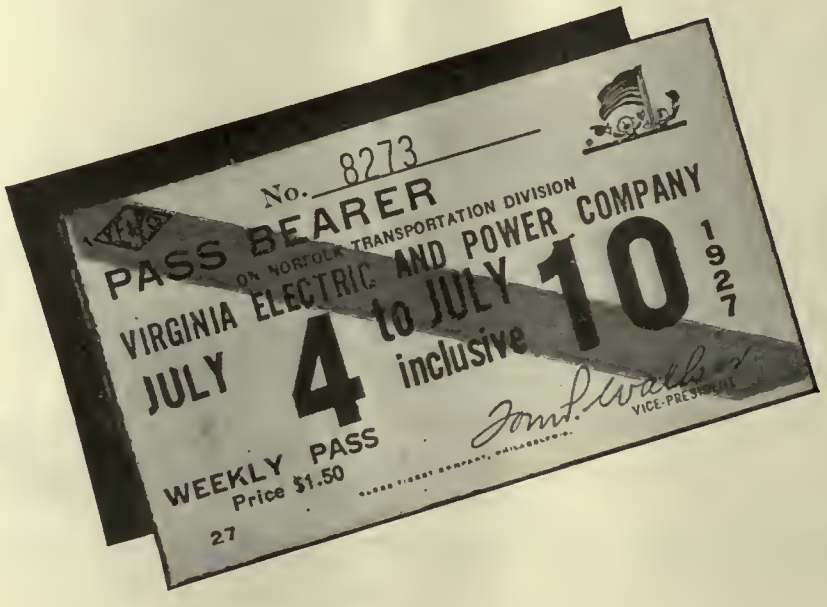
The "Peacock" (Reg. U. S. Pat. Off.) Staffless

National Brake Company, Inc.

890 Ellicott Square Buffalo, N. Y.

Canadian Representative,
Lyman Tube & Supply Co., Ltd., Montreal, Can.

This Is a Pass



The user thereof does not have to hunt for a coin or stop for change or transfer transactions. He can board or leave without breaking his stride.

The purchaser of a *pass*—whether weekly, Sunday-Holiday or off-peak—has exactly one transaction and no more.

Consider what this means in expediting your car movement in one-man operation.

Passes can be installed either to supplement present fares or to provide a low fare for regular riders in synchronism with an increased fare for other riders.

Write for the facts from *experience* showing the difference in riding habit when the fare is prepaid via pass or is paid for each ride as taken.

Walter Jackson

Fare and Bus Consultant

160 Gramatan Ave., Mount Vernon, N. Y.

A *Plain* Statement

DUCO finish on rolling stock outlasts old-type finishes several times over.

This is not theory—but fact. Duco stands up longer and cleans more easily because Duco is harder—tougher.

The growing trend toward Duco-finished cars is the result of Duco endurance, proven beyond any possibility of doubt through service on thousands of miles of the railways of the world, under all service conditions.

DUPONT DUCO

E. I. du Pont de Nemours & Co., Inc.
Chemical Products Division, Parlin, N. J.
2100 Elston Avenue, Chicago, Ill.
569 Mission Street, San Francisco, Cal.



Toncan Culverts
Are Durable Under Any Conditions

TONCAN
COPPER
Mo-lyb-den-um
IRON

Following are the makers of Toncan Culverts. Write the nearest one:

The Berger Mfg. Co., of Mass. Boston, Mass.
The Berger Manufacturing Co. Dallas, Texas
The Berger Manufacturing Co. Jacksonville, Florida
The Berger Manufacturing Co. Minneapolis, Minn.
The Berger Manufacturing Co. Philadelphia, Pa.
The Berger Manufacturing Co. Roanoke, Virginia
The Canton Culvert & Silo Co. Canton, Ohio
The Firman L. Carswell Mfg. Co. Kansas City, Kan.
The Pedlar People Limited, Oshawa, Ontario, Canada
Tri-State Culvert Mfg. Co. Memphis, Tenn.
The Wheat Culvert Co., Inc. Newport, Ky.

CULVERTS of flexible corrugated metal have proven their value for many years.

They adjust themselves to shifting of the fill and have the required strength to resist vibrations and the pressures of swelling or freezing soils.

But ordinary corrugated culverts frequently encounter chemical action that attacks the metal and shortens life.

For this reason many roads prefer culverts of Toncan Iron. Toncan Iron has copper and molybdenum added to increase its resistance to just such action. It combats corrosion better, lasts longer and is therefore worth more.

CENTRAL ALLOY STEEL CORPORATION, *Massillon*, OHIO
World's Largest and Most Highly Specialized Alloy Steel Producers
Makers of Agathon Alloy Steels

Cleveland Detroit Chicago New York St. Louis
Syracuse Philadelphia Los Angeles Tulsa
Cincinnati San Francisco Seattle

TONCAN COPPER MO-LYB-DEN-UM IRON

Performance

on the road ~
in the records

Meriting Their Ever-



Above is shown a 21-passenger street car type Graham Brothers Motor Coach in service on Jefferson Avenue, Detroit, where express trolley service is proving successful. Coaches pick up and deliver passengers at the curb stops between express stops and transfer them to and from the cars. Detroit Street Railways operate 198 Graham Brothers coaches.

Below is a Graham Brothers Parlor Coach which operates between the Ford Airport in Detroit and downtown hotels, in connection with the recently inaugurated air service between Cleveland and Detroit. It is indicative of the variety of uses for the parlor coach, ideal unit for any kind of fast, deluxe service.



GRAHAM MOTOR

SOLD BY DODGE BROTHERS

Increasing Popularity

Performance in Service of 6-Cylinder Graham Brothers Motor Coaches has Fulfilled Operators' Highest Expectations—Sales Reflect Continued Preference

Operators all over the country purchased Graham Brothers 6-cylinder motor coaches some months ago wholly on the basis of their profitable experience with the previous 4-cylinder type.

Now additional purchases are being made because of the splendid performance of the 6-cylinder coaches themselves in actual service.

Superior products hold and build up this confidence year after year. 6-cylinder engine, 4-speed transmission, 4-wheel brakes (Lockheed hydraulic) and 3-stage progressive type springs are major features. In terms of operation they mean more power, speed, flexibility, safety and comfort—with the dependability and low operating costs for which Graham Brothers Motor Coaches have long been famous.

$4045
12-Passenger
Parlor Coach
(f. o. b. Detroit)

$4060
21-Passenger
Street Car Type
(f. o. b. Detroit)

$4290
16-Passenger
Parlor Coach
(f. o. b. Detroit)

BROTHERS COACHES

DEALERS EVERYWHERE

Product of a Great Institution

Graham Brothers Motor Coaches are the product of a great institution—sound, stable and experienced.

They are built complete, bodies as well as chassis, by Graham Brothers, a division of Dodge Brothers, Inc.

They are sold and serviced by Dodge Brothers Dealers everywhere.

When you purchase a Graham Brothers Motor Coach you have the assurance of Graham Brothers for the excellence of the product. And your dealings are with your local Dodge Brothers Dealer who will be right there where you bought your equipment this year, next year—whenever you need him.

GRAHAM BROTHERS

EVANSVILLE – DETROIT – STOCKTON

A DIVISION OF DODGE BROTHERS, INC.

GRAHAM BROTHERS (CANADA) LIMITED, TORONTO, ONTARIO

Printed in U

101 YEARS OF MANUFACTURING EXPERIENCE

Snow sweeper rattan and cane webbing may be ordered through any H-W sales office.



No. 327-M

FOR INTERURBAN NEEDS

THIS Heywood-Wakefield seat is designed for the modern type of interurban service where comfort is now so important. It has been selected for both new cars and for replacement use.

It has deep, double spring cushions shaped to allow more leg freedom. Mechanism rails are set in. The individual backs are properly pitched for comfort.

Our car seating experts will be glad to help you decide on the best seating equipment for your needs. This service is free through any H-W sales office.



If you have not received a copy of our new Bus Seat Catalogue, write for it.

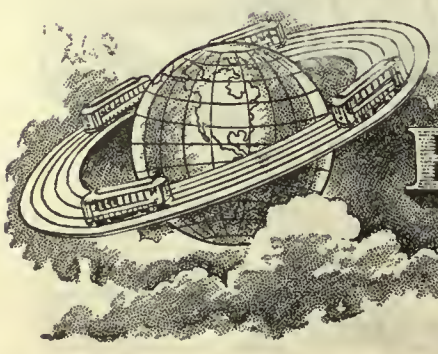
Heywood-Wakefield
REG. U.S. PAT. OFF.



Heywood-Wakefield Co., Wakefield, Mass.; 516 West 34th St., New York, N. Y.; 439 Railway Exchange Bldg., Chicago, Ill. H. G. Cook, Hobart Bldg., San Francisco, Cal. The G. F. Cotter Supply Co., Houston, Texas. F. N. Grigg, 630 Louisiana Ave., Washington, D. C. The Railway & Power Engineering Corp., 133 Eastern Ave., Toronto; Montreal; Winnipeg, Canada.



JUST as the electric railway companies have to compile and be guided by exhaustive statistics as to peak loads, traffic densities, costs per mile, and so forth, we must constantly keep ourselves informed as to purchasing power, density of population and all vital market information in order to maintain our service as an active asset of your service.



Barron G. Collier
INCORPORATED
CANDLER BLDG. NEW YORK



Good Shoes

IT'S the extra season of service and the fact that they continue to satisfy the wearer that makes it worthwhile to buy good shoes.

The same principle applies to *brake* shoes. The fact that American Brake Shoes do more foot pounds of work and that they continue to function efficiently and dependably throughout an extra period of service, more than repays the difference in cost.

"Best by Test"

THE AMERICAN BRAKE SHOE AND FOUNDRY COMPANY

30 CHURCH ST., NEW YORK
332 SO. MICH. AVE., CHICAGO

Why Le Carbone? Carbon Brushes?



Reason No. 15

They are the longest wearing of all carbon brushes yet they do not wear your commutators. It is cheaper, is it not, to pay a *little* more for inexpensive items, such as carbon brushes, than to pay a *lot* more for repairs to costly armatures?

They talk for themselves

W. J. Jeandron
Factory Terminal Bldg.
Fifteenth Street, Hoboken, N. J.
Pittsburgh Office: 634 Wabash Bldg.
Chicago Office: 1657 Monadnock Block
San Francisco Office: 525 Market Street
Canadian Distributors: Lyman Tube & Supply Co., Ltd.
Montreal and Toronto

Switch over!

IF YOU are on the side track of delayed, wasteful cleaning, "switch over" to fast-schedule, non-stop Oakite cleaning.

Oakite materials will complete every washing or cleaning job in the car shop more efficiently and economically than can be done with ordinary cleaners. Interiors and exteriors of car bodies as well as truck bodies, air pumps and control apparatus are rid of grease, grime and dirt quickly and thoroughly—at minimum cost in time, labor and material.

Try Oakite cleaning—and compare! An Oakite Service Man is at your disposal, to help you. Write us; no obligation.

Oakite Service Men, cleaning specialists, are located in the leading industrial centers of the U. S. and Canada

Oakite is manufactured only by
OAKITE PRODUCTS, INC., 28B Thames St., NEW YORK, N. Y.
(Formerly OAKLEY CHEMICAL CO.)

OAKITE
TRADE MARK REG. U.S. PAT. OFF.
Industrial Cleaning Materials and Methods

COLUMBIA 13 92 MACHINE WORKS

COLUMBIA

Railway Supplies and Equipment

Machine and
Sheet Metal Work

Forgings
Special Machinery
and Patterns

Grey Iron and
Brass Castings

Armature and
Field Coils.

The Columbia Machine Works *and M. I. Co.*
265 Chestnut St., corner Atlantic Ave.,
Brooklyn, New York



AXLES

MORE than sixty years of experience in the manufacture of axles, coupled with every facility for correct heat treatment and accurate testing, insure the meeting of the specification in the finished product.

Prompt deliveries of Car and Tender Axles, Engine Truck and Driving Axles, Electric Motor and Street Car Axles, Miscellaneous Forgings.

CARNEGIE STEEL COMPANY
General Offices · Carnegie Building : 434 Fifth Avenue
PITTSBURGH PENNSYLVANIA

1835

Free Holiday Stamping Offer!

UNTIL January 1st, 1928 we will stamp your name, or a friend's name, in gold on the front cover of this book without additional charge. Proper remittance should be enclosed with orders and, of course, stamped copies are not returnable.

This second edition of Richey covers the latest developments—describes new methods—records changes in theory and practice. It covers every phase of electric railway work from Roadbed and Track to Signals and Communication.

Saves time and trouble



Take advantage of this offer!

Second Edition. 798 pages, flexible, pocket size, fully illustrated. $4.00 net, postpaid.

This widely-known handbook is virtually an encyclopedia, on modern electric railway organization, administration and operation.

It presents

(1) Data on subjects which come up in everyday electric railway practice for constant use by the operating, constructing and designing engineer.
(2) Material of service to the non-technical manager or operator.
(3) Reference material on electric railway practice for those who are specializing in other or allied fields.

Information every electric railway man needs—the latest and best methods—changes in practice and theory—that's the new Richey.

Fill in and mail this coupon NOW!

McGRAW-HILL

FREE STAMPING OFFER COUPON

McGraw-Hill Book Co., Inc., 370 Seventh Ave., New York, N. Y.

Send me Richey's ELECTRIC RAILWAY HANDBOOK, $4.00 net, postpaid with name stamped in gold on the front cover. I am enclosing the proper remittance and understand that stamped books are not returnable. (This offer expires Jan. 1st, 1928.)

.....
(Name to be stamped)

Signed .....

Address .....

Official Position .....

Name of Company .....

E. 11-26-27



Helical Gear and Pinion

An Investment in Economy

Nuttall helical gears are an investment in the interest of lower operating costs. Smooth and vibrationless in operation, they prolong the life of other equipment. Strong and long wearing, they will out wear spur gears and eliminate tooth breakage. The BP "tough-hard" treatment gives a gear with stamina, which can stand the most strenuous service and still make an astonishing mileage record. Nuttal BP helical gears are still in service with over three quarters of a million car miles to their credit, and still going strong.

Send for bulletin No. 52.

R.D.NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

All Westinghouse Electric & Mfg. Co. district offices are sales representatives for Nuttall Railway Products

Canadian Agent,
Lyman Tube & Supply Co., Montreal

MEMBER AEIC AERA 1927

Nuttall

Bankers and Engineers

Ford, Bacon & Davis
Incorporated
Engineers
115 Broadway, New York
PHILADELPHIA CHICAGO SAN FRANCISCO

The J. G. White Engineering Corporation
Engineers—Constructors
Oil Refineries and Pipe Lines, Steam and Water Power Plants, Transmission Systems, Hotels, Apartments, Office and Industrial Buildings, Railroads.
43 Exchange Place New York

STONE & WEBSTER
Incorporated
Design and Construction
Examinations Reports Appraisals
Industrial and Public Service Properties
NEW YORK BOSTON CHICAGO

THE BEELER ORGANIZATION
Transportation, Traffic, Operating Surveys
Better Service—Financial Reports
Appraisals—Management
52 Vanderbilt Ave. New York

SANDERSON & PORTER
ENGINEERS
PUBLIC UTILITIES & INDUSTRIALS
Design Construction Management
Examinations Reports Valuations
CHICAGO NEW YORK SAN FRANCISCO

ENGELHARDT W. HOLST
Consulting Engineers
Appraisals Reports Rates Service Investigation
Studies on Financial and Physical Rehabilitation
Reorganization Operation Management
683 Atlantic Ave., BOSTON, MASS.

ALBERT S. RICHEY
ELECTRIC RAILWAY ENGINEER
WORCESTER, MASSACHUSETTS
REPORTS - APPRAISALS - RATES - OPERATION - SERVICE

LINN & MARSHALL, *Inc.*
Financing — Engineering — Management
PUBLIC UTILITIES
ELECTRIC RAILWAYS — MOTOR BUSES —
GAS — ELECTRIC
25 Broadway, New York City

C. B. BUCHANAN, President — W. H. PRICE, JR., Sec'y-Treas. — JOHN F. LAYNG, Vice-President
BUCHANAN & LAYNG CORPORATION
Engineering and Management, Construction
Financial Reports, Traffic Surveys
and Equipment Maintenance
BALTIMORE, 1004 Citizens National Bank Bldg. — Phone: Hanover: 2142 — NEW YORK, 49 Wall Street

DAY & ZIMMERMANN, INC.
ENGINEERS
DESIGN - CONSTRUCTION - REPORTS
VALUATIONS - MANAGEMENT
NEW YORK PHILADELPHIA CHICAGO

HEMPHILL & WELLS
CONSULTING ENGINEERS
Gardner F. Wells Albert W. Hemphill
APPRAISALS
INVESTIGATIONS COVERING
Reorganization Management Operation Construction
43 Cedar Street, New York City

STEVENS & WOOD
INCORPORATED
ENGINEERS AND CONSTRUCTORS
120 BROADWAY, NEW YORK
ENGINEERING CONSTRUCTION — YOUNGSTOWN, O. — FINANCING MANAGEMENT

KELKER, DeLEUW & CO.
CONSULTING ENGINEERS
REPORTS ON
Operating Problems Valuations Traffic Surveys
111 W. Washington Street, Chicago, Ill.

McCLELLAN & JUNKERSFELD
Incorporated
ENGINEERING AND CONSTRUCTION
Examinations—Reports—Valuations
Transportation Problems—Power Developments
68 Trinity Place, New York
Chicago St. Louis

E. H. FAILE & CO.
Designers of
Garages— Service Buildings—Terminals
441 LEXINGTON AVE. NEW YORK

WALTER JACKSON
Consultant on Fares and Motor Buses
The Weekly and Sunday Pass—Differential Fares—Ride Selling
Holbrook Hall 5-W-3
160 Gramatan Ave., Mt. Vernon, N. Y.

THE BABCOCK & WILCOX COMPANY

85 Liberty Street, New York

Builders since 1868 of Water Tube Boilers of continuing reliability

BRANCH OFFICES

Boston, 80 Federal Street
Philadelphia, Packard Building
Pittsburgh, Farmers Deposit Bank Building
Cleveland, Guardian Building
Chicago, Marquette Building
Cincinnati, Traction Building
Atlanta, Candler Building
Phoenix, Ariz., Heard Building
Dallas, Tex., Magnolia Building
Honolulu, H. T., Castle & Cooke Building
Portland, Ore., Gasco Building



WORKS
Bayonne, N. J.
Barberton, Ohio

Makers of Steam Superheaters since 1898 and of Chain Grate Stokers since 1893

BRANCH OFFICES

Detroit, Ford Building
New Orleans, 344 Camp Street
Houston, Texas, Electric Building
Denver, 444 Seventeenth Street
Salt Lake City, Kearns Building
San Francisco, Sheldon Building
Los Angeles, Central Building
Seattle, L. C. Smith Building
Havana, Cuba, Calle de Aguiar 104
San Juan, Porto Rico, Royal Bank Building

THE P. EDWARD WISH SERVICE

50 Church St. NEW YORK — *Street Railway Inspection* DETECTIVES — 131 State St. BOSTON

Byllesby Engineering & Management Corporation

231 S. La Salle Street, Chicago

New York — San Francisco

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

Hale and Kilburn SEATS

Better Quality Seats For Cars and Buses

Hale-Kilburn Co.
1800 Lehigh Ave., Philadelphia, Pa.

RAIL GRINDERS AND WELDERS

Railway Track-work Co., Philadelphia

682

ILLINOIS MOTIVE EQUIPMENT COMPANY

J. D. Elsom, President

General Sales Agent—The Air Rectifier
District Representatives
Johnson Fare Box; McCloskey Bomb Shell Torch; Cinch Vertical Swipe; Fyr-Fly Spot Light

35 E. Wacker Drive — Chicago, Illinois

Hubbard and COMPANY

PITTSBURGH OAKLAND CHICAGO

UNA

RAIL JOINTS
DYNAMOTORS
WELDING ROD

UNA Welding & Bonding Co.
Cleveland, Ohio.

PS HEATERS

Car Heating and Ventilating

—are no longer operating problems. We can show you how to take care of both with one equipment. The Peter Smith Forced Ventilation Hot Air Heater will save, in addition, 40% to 60% of the cost of any other car heating and ventilating system. Write for details.

The Peter Smith Heater Company
6209 Hamilton Ave., Detroit, Mich.



Boyerized Parts:

Brake Pins
Brake Hangers
Brake Levers
Pedestal Cibs
Brake Fulcrums
Turnbuckles
Center Bearings
Side Bearings
Spring Post Bushings
Spring Posts
Bolster and Transom Chafing Plates
Manganese Brake Heads
Manganese Truck Parts
Bushings
Bronze Bearings
McArthur Turnbuckles

Can be purchased through the following representatives:

Economy Electric Devices Co.
72 W. Van Buren St., Chicago, Ill.
F. F. Bodler,
903 Monadnock Bldg., San Francisco, Cal.
W. F. McKenney,
54 First Street, Portland, Oregon.
J. H. Denton,
1328 Broadway, New York City, N. Y.
A. W. Arlin,
519 Delta Bldg., Los Angeles, Cal.

Bemis Car Truck Company
Springfield, Mass.

TULC LUBRICANT

We make a specialty of

ELECTRIC RAILWAY LUBRICATION

We solicit a test of TULC on your equipment

The Universal Lubricating Co.

Cleveland, Ohio

Chicago Representatives: Jameson-Rose Company, Straus Bldg.

"STANDARD"
STEEL PRODUCTS

Steel Axles Steel Springs
Armature Shafts
Rolled Steel Wheels

STANDARD STEEL WORKS COMPANY
PHILADELPHIA, PA.
BRANCH OFFICES
CHICAGO NEW YORK PORTLAND SAN FRANCISCO ST. LOUIS
PITTSBURGH HOUSTON RICHMOND ST. PAUL MEXICO CITY
WORKS: BURNHAM, PA.



JOHNSON
FARE
COLLECTING
SYSTEMS

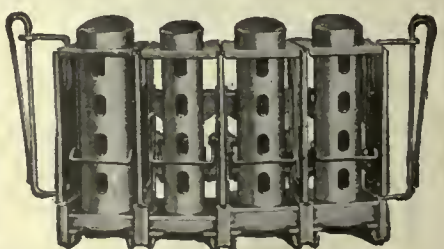


Johnson Electric Fare Boxes and overhead registers make possible the instantaneous registering and counting of every fare. Revenues are increased 1½ to 5% and the efficiency of one-man operation is materially increased. Over 4000 already in use.

When more than two coins are used as fare, the Type D Johnson Fare Box is the best manually operated registration system. Over 50,000 in use.

Johnson Change-Makers are designed to function with odd fare and metal tickets selling at fractional rates It is possible to use each barrel separately or in groups to meet local conditions. Each barrel can be adjusted to eject from one to five coins or one to six tickets.





Johnson Fare Box Co.
4619 Ravenswood Ave., Chicago, Ill.

ANNUAL

Statistical

and

Forecast

Number

Electric Railway Journal

January 14, 1928

This important number will contain:

Record of 1927 in costs and revenues.
Number of cars purchased.
Miles of track constructed and reconstructed.
Financial records for 1927.
Reviews of basic tendencies in legal, financial and regulatory matters.
A review of the significant news developments of 1927.

Together with:

A forecast of 1928 expenditures in all departments, and the trends which will shape developments and progress of 1928.

Advertising forms close

January 3, 1928

Electric Railway Journal

Tenth Ave. at 36th St., New York City

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.

Positions Vacant and all other classifications, 3 cents a word, minimum charge $2.00.

Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.

Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

1 to 3 inches.....$4.50 an inch
4 to 7 inches..... 4.30 an inch
8 to 14 inches..... 4.10 an inch

Rates for larger spaces, or yearly rates, on request.

An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

Over 6000 other men in the Electric Railway Field see this page—

Then

isn't this the logical place to advertise any business wants you may have of interest to Electric Railway men? Employment—Business—Equipment Opportunities, Etc., Etc., Etc.

POSITIONS WANTED

EQUIPMENT supervisor, thoroughly experienced and successful in maintenance of city, interurban cars and buses, desires to change location. PW-61, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

GENERAL superintendent or manager; fifteen years' successful experience. PW-55, Electric Railway Journal, Tenth Ave. at 36th St., New York.

LOOKING FOR WORK? A position wanted advertisement here, outlining your qualifications and experience, will give you the proper introduction to executives of the Electric Railway Field, seeking men for the kind of position you want.

FOR SALE

15 BIRNEY SAFETY CARS

Brill Built

West, 508 or G. E. 264 Motors

Cars Complete—Low Price—Fine Condition

ELECTRIC EQUIPMENT CO.

Commonwealth Bldg., Philadelphia, Pa.

FOR SALE BY

Boston Elevated Railway

Snow Scrapers

13—"Root," in good condition. For use on buses. Price $50.00 each f.o.b. Boston. Subject to prior sale.

Address Purchasing Agent

31 St. James Ave., Boston

Public Auction Sale of Trolley Cars

The Department of Plant and Structures of the City of New York will offer for sale at public auction at the office of the Department, Room 1800 Municipal Building, Manhattan, New York City, **on Monday, December 5, 1927, beginning at 10:30 a.m.,** a number of Trackless Trolley cars and Trolley cars as follows:

SEVEN (7) TRACKLESS TROLLEY CARS (ATLAS BUSES), now stored at Car Barn at Concord, Staten Island.

FIFTEEN (15) TRACKLESS TROLLEY CARS (BROCKWAY BUSES). Ten of these cars are now stored at Greenridge Car Barns, Arthur Kill Road, Greenridge, Staten Island, and five are now stored at Concord Car Barns, Concord, Staten Island.

THIRTY-EIGHT (38) TROLLEY CARS (BIRNEY TYPE), now stored at the Car Barn at Concord, Staten Island.

FIFTEEN (15) TROLLEY CARS (SECOND AVENUE TYPE), now stored at the car barn at Concord, Staten Island.

THIRTY-THREE (33) TROLLEY CARS (BIRNEY TYPE), now stored at the Williamsburg Bridge Car Barn, Bedford Avenue, between South 5th and South 6th Streets, Brooklyn, N. Y., and at the Essex Street Terminal at the Manhattan end of the Williamsburg Bridge.

All the cars now stored as above set forth may be examined by intending bidders any day prior to sale by appointment first made with the Engineer in Charge, at his office, 400 Kent Avenue, Brooklyn, N. Y., Telephone, Stagg 6712.

Full detailed information and terms of sale will be furnished upon application to the undersigned at his office, Room 1800, Municipal Building, Manhattan, New York City.

Dated: November 11, 1927.

ALBERT GOLDMAN,
Commissioner of Plant and Structures.

"Think SEARCHLIGHT *First"*—

To Find Men or Employment

Technical or Skilled, Plant or Office, Executive, Operative or Selling

To Locate Business Opportunities

Capital, Partners, Selling Agencies, Franchises, Contracts, Auctions, Instructions, etc.

To Sell, Rent, Exchange or Buy

Plants, Properties, Factory Buildings, Industrial Sites, Patents, Inventions or Miscellaneous Items.

0168

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Brakes
General Electric Co.
Westinghouse Air Brake Co.

Anchors, Guy
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M Co.

Armature Shop Tools
Columbia Machine Works
Elec. Service Supplies Co.

Automatic Return Switch Stands
Ramapo Ajax Corp.

Automatic Safety Switch Stands
Ramapo Ajax Corp.

Axles
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Cincinnati Car Co.
Illinois Steel Co.
St. Louis Car Co.
Standard Steel Works
Westinghouse E. & M. Co.

Babbitting Devices
Columbia Machine Works & M. I. Co.

Badges and Buttons
Elec. Service Supplies Co.
International Register Co.

Barges, Steel
American Bridge Co.

Batteries, Dry
Nichols-Lintern Co.

Bearings and Bearing Metals
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
St. Louis Car Co.
Westinghouse E. & M. Co.

Bearings, Center and Roller Side
Cincinnati Car Co.
Columbia Machine Works
Stucki Co., A.

Bearings, Roller
Timken Roller Bearing Co.

Bells and Buzzers
Consolidated Car Heating Co.

Bells and Gongs
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
St. Louis Car Co.

Benders, Rail
Railway Trackwork Co.

Body Material, Haskelite Plymetl
Haskelite Mfg. Corp.

Bodies, Bus
Brill Co., The J. G
Cummings Car & Coach Co.
St. Louis Car Co.

Boilers
Babcock & Wilcox Co.

Bolts & Nuts, Track
Illinois Steel Co.

Bond Testers
American Steel & Wire Co.
Electric Service Supplies Co.

Bonding Apparatus
American Steel & Wire Co.
Elec. Service Supplies Co
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co

Bonds, Rail
American Steel & Wire Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Book Publishers
McGraw-Hill Book Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, etc.)
American Bridge Co.
Bates Expanded Steel Truss Co.
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Brill Co., The J. G
Cincinnati Car Co.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
American Brake Shoe & Foundry Co.
Bemis Car Truck Co.
Brill Co., The J. G.
St. Louis Car Co.
Taylor Electric Truck Co.

Brake Testers
National Ry. Appliance Co.

Brakes, Brake Systems and Brake Parts
Bemis Car Truck Co
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
General Electric Co.
National Brake Co.
St. Louis Car Co.
Westinghouse Tr. Br. Co.

Brakes, Magnetic Rail
Cincinnati Car Co.

Bridges, Steel
American Bridge Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
LeCarbone Co.
Westinghouse E. & M. Co.

Brushholders
Columbia Machine Works
General Electric Co.

Buildings, Steel
American Bridge Co.

Bulkheads
Haskelite Mfg. Corp.

Bunkers, Coal
American Bridge Co.

Buses
Cummings Car & Coach Co.
General Electric Co.
Graham Bros.
Studebaker Corp. of America

Bus Lighting
National Ry. Appliance Co.

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works
St. Louis Car Co.

Cables (See Wires and Cables)

Cambric Tapes, Yellow and Black Varnish
General Electric Co.
Irvington Varnish & Ins. Co.

Carbon Brushes (See Brushes, Carbon)

Car Lighting Fixtures
Elec. Service Supplies Co.

Car Panel Safety Switches
Consolidated Car Heating Co.
Westinghouse E. & M. Co.

Car Steps, Safety
Cincinnati Car Co.

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Cars, Dump
Brill Co., The J. G.
Differential Steel Car Co.
St. Louis Car Co.

Cars, Gas-Electric
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co.

Cars, Gas, Rail
Brill Co., The J. G.
St. Louis Car Co.

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Cincinnati Car Co.
Cummings Car & Coach Co.
Kuhlman Car Co., G. C.
St. Louis Car Co.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Cars, Self-Propelled
Brill Co., The J. G.

Castings, Brass Composition or Copper
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.

Castings, Gray Iron and Steel
American Brake Shoe & Fdry.
American Bridge Co.
American Steel Foundries
Bemis Car Truck Co.
Columbia Machine Works & M. I. Co.
St. Louis Car Co.
Standard Steel Works

Castings, Malleable & Brass
American Brake Shoe & Foundry Co.
Bemis Car Truck Co.
Columbia Machine Works & M. I. Co.
St. Louis Car Co.

Catchers and Retrievers, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.

Ceiling Car
Haskelite Mfg. Corp.

Ceilings Plywood Panels
Haskelite Mfg. Corp.

Chairs, Parlor Car
Heywood Wakefield Co.

Change Carriers
Cleveland Fare Box Co.
Electric Service Supplies Co.

Change Trays
Cincinnati Car Co.

Circuit-Breakers
General Electric Co.
Westinghouse E. & M. Co.

Clamps and Connectors for Wires and Cables
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Cleaners
Oakite Products Co.

Cleaners and Scrapers Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.

Coil Banding and Winding Machines
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

Coils, Armature and Field
Columbia Machine Works & M. I. Co.
General Electric Co.
Westinghouse E. & M. Co.

Coils, Choke and Kicking
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Coin Changers
Illinois Motive Equip. Co.
Johnson Fare Box Co.

Coin Counting Machines
Cleveland Fare Box Co.
International Register Co.
Johnson Fare Box Co.

Coin Sorting Machines
Cleveland Fare Box Co.
Johnson Fare Box Co.

Coin Wrappers
Cleveland Fare Box Co.

Commutator Slotters
Columbia Machine Works
Elec. Service Supplies Co.
Westinghouse E. & M. Co.
Wood Co., Chas. N.

Commutators or Parts
Columbia Machine Works & M. I. Co.
General Electric Co.
Westinghouse E. & M. Co.

Compressors, Air
General Electric Co.
Westinghouse Tr. Br. Co.

Condensers
General Electric Co.
Westinghouse E. & M. Co.

Condenser Papers
Irvington Varnish & Ins. Co.

Connectors, Solderless
Westinghouse E. & M. Co.

Connectors, Trailer Car
Columbia Machine Works
Consolidated Car Heating Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Controllers or Parts
Columbia Machine Works & M. I. Co.
General Electric Co.
Westinghouse E. & M Co.

Controller Regulators
Elec. Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse E. & M. Co.

Converters, Rotary
General Electric Co.
Westinghouse E. & M. Co.

Conveying & Hoisting Machinery
American Bridge Co.

Copper Wire
American Brass Co
American Steel & Wire Co.
Anaconda Copper Mining Co.

Copper Wire Instruments, Measuring, Testing and Recording
American Brass Co.
Anaconda Copper Mining Co.

Cord, Bell, Trolley, Register
American Steel & Wire Co.
Brill Co., The J. G.
Elec. Service Supplies Co.
International Register Co.
Roebling's Sons Co., John A.
St. Louis Car Co.
Samson Cordage Works

Cord Connectors and Couplers
Elec. Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
American Steel Foundries
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
Ohio Brass Co.
Westinghouse Traction Brake Co.

Cowl Ventilators
Nichols-Lintern Co.

Cranes, Hoists & Lifts
Electric Service Supplies Co.

Cross Arms (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossings
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Frogs & Switches
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Track (See Track Special Work)

Crossings, Trolley
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Culverts
Central Alloy Steel Corp.

Curtains & Curtain Fixtures
Brill Co., The J. G.
St. Louis Car Co.

Cutting Apparatus
Electric Railway Improvement
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse Electrical & Mfg. Co.

Dealer's Machinery & Second Hand Equipment
Electric Equipment Co.

Derailing Devices (See also Track Work)

Derailing Switches
Ramapo Ajax Corp.

Destination Signs
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.

Detective Service
Wish-Service, P. Edward

Door Operating Devices
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Heating Co.
National Pneumatic Co.

Doors & Door Fixtures
Brill Co., The J. G.
Cincinnati Car Co.
Hale-Kilburn Co.
St. Louis Car Co.

Doors, Fuiding Vestibule
National Pneumatic Co.

Drills, Track
American Steel & Wire Co.
Electric Service Supplies Co.
Ohio Brass Co.

Dryers, Sand
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Ears
Columbia Machine Works & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Electric Grinders
Railway Trackwork Co.

Electric Rivet Heaters
American Car & Fdry. Co.

Electric Transmission Towers
American Bridge Co.

Electrical Wires and Cables
Amer. Electrical Works.
American Steel & Wire Co.
John A. Roebling's Sons Co.

Electrodes, Carbon
Railway Trackwork Co.
Una Welding & Bonding Co.

Electrodes, Steel
Railway Trackwork Co.
Una Welding & Bonding Co.

Enamel
Du Pont de Nemours & Co., E. I.

Engineers, Consulting, Contracting and Operating
Beeler, John A.
Byllesby Co., H. M.
Day & Zimmermann, Inc.
Falle & Co., E. H.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & DeLeuw
Linn & Marshall Co.
McClellan & Junkersfeld
Richey, Albert S.
Sanderson & Porter
Stevens & Wood
Stone & Webster Co.
White Eng. Corp., The J. G

Engines, Gas, Oil or Steam
Westinghouse E. & M. Co

Exterior Side Panels
Haskelite Mfg. Corp.

Fare Boxes
Cleveland Fare Box Co.
Illinois Motive Equip. Co.
Johnson Fare Box Co.
Perey Mfg. Co.

Fare Registers
Electric Service Supplies Co
Johnson Fare Box Co.

Fences, Woven Wire & Fence Posts
American Steel & Wire Co

Fenders and Wheel Guards
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Fender Co
St. Louis Car Co.
Star Brass Works
Wood Co., Chas. N.

Fibre and Fibre Tubing
Westinghouse E. & M. Co.

Field Coils (See Coils)

Floodlights
Electric Service Supplies Co
General Electric Co.

Floor, Sub
Haskelite Mfg. Corp.

Floors
Haskelite Mfg. Corp.

Forgings
Brill Co., The J. G.
Cincinnati Car Co.
Standard Steel Works

Frogs & Crossings, Tee Rail
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Frogs, Track (See Track Work)

Frogs, Trolley
Electric Service Supplies Co
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Furnaces, Electric Steel Melting
American Bridge Co.

Fuses and Fuse Boxes
Columbia Machine Works & M. I. Co.
Consolidated Car Heating Co
General Electric Co.
Westinghouse E. & M Co

Gas Electric Drive for Buses
General Electric Co.

AMERICAN BRIDGE COMPANY

EMPIRE BUILDING—71 BROADWAY NEW YORK, N. Y.

Manufacturers of Steel Structures of all classes particularly BRIDGES AND BUILDINGS

ALSO STEEL BARGES FOR HARBORS AND RIVERS, STEEL TOWERS FOR ELECTRIC TRANSMISSION, HEROULT ELECTRIC FURNACES, ETC.

SALES OFFICES:

NEW YORK, N. Y.
Philadelphia, Pa.
Boston, Mass.
Baltimore, Md.

PITTSBURGH, PA.
Cincinnati, Ohio
Cleveland, Ohio
Detroit, Mich.

CHICAGO, ILL.
St. Louis, Mo.
Denver, Colo.
Salt Lake City, Utah
Duluth, Minn.
Minneapolis, Minn.

Pacific Coast Representative:
U. S. Steel Products Co.,
Pacific Coast Dept.
San Francisco, Cal.
Los Angeles, Cal.
Portland, Ore.
Seattle, Wash.

Export Representative: United States Steel Products Co., 30 Church Street, New York.

Lorain Special Trackwork Girder Rails

Electrically Welded Joints

THE LORAIN STEEL COMPANY

Johnstown, Pa.

Sales Offices:

Atlanta Chicago Cleveland New York
Philadelphia Pittsburgh Dallas

Pacific Coast Representative:
United States Steel Products Company
Los Angeles Portland San Francisco Seattle

Export Representative:
United States Steel Products Company, New York, N. Y.

SPECIAL TRACKWORK

of the famous

TISCO MANGANESE STEEL

WM. WHARTON JR. & CO., INC.

EASTON, PA.

Sales Offices:

Boston Chicago El Paso Montreal New York Philadelphia
Pittsburgh San Francisco Scranton

Kalamazoo Trolley Wheels

The value of Kalamazoo Trolley Wheels and Harps has been demonstrated by large and small electric railway systems for a period of thirty years. Being exclusive manufacturers, with no other lines to maintain, it is through the high quality of our product that we merit the large patronage we now enjoy. With the assurance that you pay no premium for quality we will appreciate your inquiries.



THE STAR BRASS WORKS

KALAMAZOO, MICH., U. S. A.

B. A. HEGEMAN, Jr., President H. A. HEGEMAN, First Vice-Pres. and Treas
F. T. SARGENT, Secretary W. C. PETERS, Vice-Pres. Sales and Engineering

National Railway Appliance Co.

Graybar Building, 420 Lexington Ave., New York

BRANCH OFFICES

Munsey Bldg., Washington, D. C. 100 Boylston St., Boston, Mass.
Hegeman-Castle Corporation, Railway Exchange Building, Chicago, Ill.

RAILWAY SUPPLIES

Tool Steel Gears and Pinions
Anglo-American Varnish Co., Varnishes, Enamels, etc.
National Hand Holds
Genesco Paint Oils
Dunham Hopper Door Device
Garland Ventilators
Walter Tractor Snow Plows
Feaaible Drop Brake Staffs
Ft. Pitt Spring & Mfg. Co., Springs
Flaxlinum Insulation
Economy Electric Devices Co.
Power Saving and Inspection Meters
National Safety Devices Company's Whistle Blowers, Gong Ringers and Brake Hangers
Godward Gas Generators
Cowdry Automotive Brake Testing Machine

AMERICAN ELECTRICAL WORKS — AMELECTRIC — Wires and Cables — PHILLIPSDALE, R.I.

Reg. U. S. Pat. Office

AMELECTRIC PRODUCTS

BARE COPPER WIRE AND CABLE

TROLLEY WIRE

WEATHERPROOF WIRE AND CABLE

PAPER INSULATED UNDERGROUND CABLE

MAGNET WIRE

AMERICAN ELECTRICAL WORKS

PHILLIPSDALE, R. I.

Chicago, 10-32 West Randolph Street.
Cincinnati, Traction Bldg.: New York, 100 E. 42nd St.

Bethlehem Products for Electric Railways

Tee and Girder Rails; Machine Fitted Joints; Splice Bars; Hard Center Frogs; Hard Center Mates; Rolled Alloy Steel Crossings; Abbott and Center Rib Base Plates; Rolled Steel Wheels and Forged Axles; Tie Rods; Bolts; Tie Plates and Pole Line Material.

Catalog Sent on Request

BETHLEHEM STEEL COMPANY, Bethlehem, Pa.

BETHLEHEM

Gaskets
Westinghouse Tr. Br. Co.

Gas Producers
Westinghouse E. & M. Co

Gates, Car
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.

Gear Blanks
Brill Co., The J. G.
Standard Steel Works

Gear Cases
Chillingworth Mfg. Co.
Columbia Machine Works & M. I. Co.
Electric Service Supplies Co
Westinghouse E. & M. Co.

Gears and Pinions
Bemis Car Truck Co.
Columbia Machine Works & M. I. Co.
Electric Service Supplies Co
General Electric Co.
Nat'l Ry. Appliance Co.
R. D. Nuttall Co.
Tool Steel Gear & Pinion Co.

Generators
General Electric Co.
Leece Neville Co.
Westinghouse E. & M. Co.

Girder Rails
Bethlehem Steel Co.
Lorain Steel Co.

Gongs (See Bells and Gongs)

Greases (See Lubricants)

Grinders, Portable
Railway Trackwork Co.

Grinders, Portable Electric
Railway Trackwork Co.

Grinding Bricks and Wheels
Railway Trackwork Co.

Guard Rail Clamps
Ramapo Ajax Corp.

Guard Rails, Tee Rail & Manganese
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Guards, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.

Harps, Trolley
Columbia Machine Works
Elec. Service Supplies Co.
R. D. Nuttall Co.
Star Brass Works

Headlights
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

Headlining
Columbia Machine Works & M. I. Co.
Haskelite Mfg. Corp.

Heaters, Bus
Nichols-Lintern Co.

Heaters, Car (Electric)
Consolidated Car Heating Co.
Gold Car Heat. & Ltg. Co.
Railway Utility Co.
Smith Heater Co., Peter

Heaters, Car, Hot Air and Water
Smith Heater Co., Peter

Heaters, Car Stove
Smith Heater Co., Peter

Heaters, Electric Rivet
American Car & Fdry. Co.

Helmets, Welding
Railway Trackwork Co.
Una Welding & Bonding Co.

Hoists & Lifts
Columbia Machine Works & M. I. Co.

Hose, Bridges
Ohio Brass Co.

Hose, Pneumatic
Westinghouse Traction Brake Co.

Ignition Units
Leece Neville Co.

Instruments, Measuring, Testing and Recording
American Steel & Wire Co.
General Electric Co.
National Ry. Appliance Co.
Westinghouse E. & M. Co.

Insulating Cloth, Paper and Tape
General Electric Co.
Irvington Varnish & Ins. Co.
Okonite Co.
Okonite-Callender Cable Co.
Westinghouse E. & M. Co.

Insulating Silk
Irvington Varnish & Ins. Co.

Insulating Varnishes
E. I. Du Pont de Nemours Co.
Irvington Varnish & Ins. Co.

Insulation (See also Paints)
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
Irvington Varnish & Ins. Co.
Okonite Co.
Okonite-Callender Cable Co.
Westinghouse E. & M. Co.

Insulation Slots
Irvington Varnish & Ins. Co.

Insulator Pins
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Insulators (See also Line Materials)
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Interior Side Linings
Haskelite Mfg. Corp.

Jacks (See also Cranes, Hoists and Lifts)
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.

Joints, Rail (See Rail Joints)

Journal Boxes
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.

Lacquer
Du Pont de Nemours & Co., E. I.

Lamp Guards and Fixtures
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

Lamps, Arc & Incandescent (See also Headlights)
General Electric Co.
Westinghouse E. & M. Co.

Lamps, Signal and Marker
Elec. Service Supplies Co.
Nichols-Lintern Co.

Lanterns, Classification
Nichols-Lintern Co.

Leather
Eagle Ottawa Leather Corp.

Letter Boards
Cincinnati Car Co.
Haskelite Mfg. Corp.

Lighting Fixtures, Interior
Electric Service Supplies Co.

Lighting Systems
Leece Neville Co.

Lightning Protection
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Line Material (See also Brackets, Insulators, Wires, etc.)
Archbold-Brady Co.
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Locking Spring Boxes
Wm. Wharton, Jr. & Co.

Locomotives, Electric
Cincinnati Car Co.
Cummings Car & Coach Co.
General Electric Co.
St. Louis Car Co.
Westinghouse E. & M. Co.

Lubricating Engineers
Universal Lubricating Co.

Lubricants, Oil and Grease
Universal Lubricating Co.

Manganese Parts
Bemis Car Truck Co.

Manganese Steel Guard Rails
Ramapo Ajax Corp.
Wm. Wharton Jr. & Co.

Manganese Steel, Special Track Work
Bethlehem Steel Co.
Wm. Wharton, Jr. & Co.

Manganese Steel Switches, Frogs and Crossings
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Meters (See Instruments)

Mirrors, Inside & Outside
Cincinnati Car Co.

Motor Buses (See Buses)

Motors, Electric
General Electric Co.
Westinghouse E. & M. Co.

Motor, Generators & Controls for Electric Buses
General Electric Co.

Motorman's Seats
Brill Co., The J. G.
Cincinnati Car Co.
Elec. Service Supplies Co.
Heywood Wakefield Co.
St. Louis Car Co.
Wood Co., Chas. N.

Nuts and Bolts
Bemis Car Truck Co.
Cincinnati Car Co.
Hubbard & Co.

Oils (See Lubricants)

Omnibuses (See Buses)

Oxy-Acetylene (See Cutting Apparatus)

Packing
Westinghouse Traction Brake Co.

Paints and Varnishes (Insulating)
Elec. Service Supplies Co.
Irvington Varnish & Ins. Co.

Paints & Varnishes, Preservative
E. I. Du Pont de Nemours Co.

Paints & Varnishes, Railway
E. I. Du Pont de Nemours Co.
National Ry. Appliance Co.

Panels, Outside, Inside
Haskelite Mfg. Corp.

Paving Material
American Brake Shoe & Fdry.

Pickup, Trolley Wire
Elec. Service Supplies Co.
Ohio Brass Co.

Pinion Pullers
Elec. Service Supplies Co.
Wood Co., Chas. N.

Pinions (See Gears)

Pins, Case Hardened, Wood and Iron
Ohio Brass Co.
Westinghouse Traction Brake Co.

Pipe Fittings
Standard Steel Works
Westinghouse Tr. Brake Co.

Planers (See Machine Tools)

Plates for Tee Rail Switches
Ramapo Ajax Corp.

Pliers, Rubber Insulated
Elec. Service Supplies Co.

Plywood Roofs, Headlinings, Floors, Interior Panels, Bulkheads, Truss Planks
Haskelite Mfg. Corp.

Pole Line Hardware
Bethlehem Steel Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.

Pole Reinforcing
Hubbard & Co.

Poles, Metal Street
Bates Expanded Steel Truss Co.
Elec. Ry. Equipment Co.
Hubbard & Co.

Poles, Ties, Posts, Piling & Lumber
Nangle Pole & Tie Co.
J. F. Prettyman & Son

Poles and Ties, Treated
J. F. Prettyman & Son

Poles, Trolley
Elec. Service Supplies Co.
R. D. Nuttall Co.

Poles, Tubular Steel
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.

Portable Grinders
Railway Trackwork Co.

Potheads
Okonite Co.
Okonite-Callender Cable Co., Inc.

Power Houses
American Bridge Co.

Power Saving Devices
National Ry. Appliance Co.

Pressings, Special Steel
Cincinnati Car Co.

Pressure Regulators
General Electric Co.
Westinghouse E. & M. Co.
Westinghouse Traction Brake Co.

Punches, Ticket
International Register Co.
Wood Co., Chas. N.

Pyroxylin Finishes
Du Pont de Nemours & Co., E. I.

Rail Braces and Fastenings
Ramapo Ajax Corp.

Rail Grinders (See Grinders)

Rail Joints
Carnegie Steel Co.
Illinois Steel Co.
Rail Joint Co.

Rail Joints, Welded
Lorain Steel Co.

Rail Welding
Railway Trackwork Co.
Una Welding & Bonding Co.

Rails, Steel
Carnegie Steel Co.
Illinois Steel Co.

Railway Safety Switches
Consolidated Car Heating Co.
Westinghouse E. & M. Co.

Rattan
Brill Co., The J. G.
Cummings Car & Coach Co.
Elec. Service Supplies Co.
Hale-Kilburn Co.
Heywood Wakefield Co.
St. Louis Car Co.

Registers and Fittings
Brill Co., The J. G.
Cincinnati Car Co.
Elec. Service Supplies Co.
International Register Co.
St. Louis Car Co.

Reinforcement, Concrete
American Steel & Wire Co.
Bethlehem Steel Co.
Carnegie Steel Co.

Repair Shop Appliances (See also Coil Banding and Winding Machines)
Elec. Service Supplies Co.

Repair Work (See also Coils)
Westinghouse E. & M. Co.

Replacers, Car
Cincinnati Car Co.
Elec. Service Supplies Co.

Resistances
Consolidated Car Heating Co.
General Electric Co.

Resistance, Wire and Tube
Westinghouse E. & M. Co.

Retrievers, Trolley (See Catchers and Retrievers Trolley)

Rheostats
General Electric Co.
Westinghouse E. & M. Co.

Rivet Heaters, Electric
American Car & Fdry. Co.

Roofing, Car
Haskelite Mfg. Corp.

Roofs, Car and Bus
Haskelite Mfg. Corp.

Sanders, Track
Brill Co., The J. G.
Elec. Service Supplies Co.
Nichols-Lintern Co.
Ohio Brass Co.
St. Louis Car Co.

Sash Fixtures, Car
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.

Sash, Metal Car Window
Hale-Kilburn Co.

Scrapers, Track (See Cleaners and Scrapers, Track)

Screw Drivers, Rubber Insulated
Elec. Service Supplies Co.

Seating Materials
Brill Co., The J. G.
Haskelite Mfg. Corp.
Heywood Wakefield Co.
St. Louis Car Co.

Seats, Bus
Brill Co., The J. G.
Hale-Kilburn Co.
Heywood Wakefield Co.
St. Louis Car Co.

Seats, Car (See also Rattan)
Brill Co., The J. G.
Cincinnati Car Co.
Hale-Kilburn Co.
Heywood Wakefield Co.
St. Louis Car Co.

Second Hand Equipment
Electric Equipment Co.

Shades, Vestibule
Brill Co., The J. G.
Cincinnati Car Co.

Shovels
Brill Co., The J. G.
Hubbard & Co.

Shovels, Power
Brill Co., The J. G.

Side Bearings (See Bearings-Center and Side)

Signals, Car Starting
Consolidated Car Heating Co.
Elec. Service Supplies Co.
National Pneumatic Co.

Signals, Indicating
Nichols-Lintern Co.

Signal Systems, Block
Elec. Service Supplies Co.
Nachod and United States Electric Signal Co.
Wood Co., Chas. N.

Signal Systems, Highway Crossing
Nachod and United States Electric Signal Co.
Wood Co., Chas. N.

Slack Adjusters (See Brake Adjusters)

Sleet Wheels and Cutters
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
R. D. Nuttall Co.

Smokestacks, Car
Nichols-Lintern Co.

Snow Plows
National Ry. Appliance Co.

Snow-Plows, Sweepers and Brooms
Brill Co., The J. G.
Columbia Machine Works & M. I. Co.
Consolidated Car Fender Co.
Cummings Car & Coach Co.
St. Louis Car Co.

Snow Sweeper, Rattan
J. G. Brill Co.
Heywood Wakefield Co.

Soldering and Brazing Apparatus (See Welding Processes and Apparatus)

Special Adhesive Papers
Irvington Varnish & Ins. Co.

Special Trackwork
Bethlehem Steel Co.
Lorain Steel Co.
Wm. Wharton, Jr. & Co.

Spikes
American Steel & Wire Co.
Illinois Steel Co.

Splicing Compounds
Westinghouse E. & M. Co.

Splicing Sleeves (See Clamps and Connectors)

Springs
National Ry. Appliance Co.

Springs, Car and Truck
American Spiral Spring Co.
American Steel Foundries
American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
Standard Steel Works

Sprinklers, Track and Road
Brill Co., The J. G.
Cummings Car & Coach Co.
St. Louis Car Co.

Steel and Steel Products
American Steel & Wire Co.
Carnegie Steel Co.
Illinois Steel Co.

Steps, Car
Brill Co., The J. G.
Cincinnati Car Co.

Stokers, Mechanical
Babcock & Wilcox Co.
Westinghouse E. & M. Co

Stop Signals
Nichols-Lintern Co.

Storage Batteries (See Batteries, Storage)

Strain Insulators
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Strand
American Steel & Wire Co.
Roebling's Sons Co., J. A.

Street Cars (See Cars, Passenger, Freight, Express)
Cummings Car & Coach Co.

Superheaters
Babcock & Wilcox Co.

Sweepers, Snow (See Snow Plows, Sweepers and Brooms)

Switches
General Electric Co.

Switch Stands and Fixtures
Ramapo-Ajax Corp.

Switches, Selector
Nichols-Lintern Co.

Switches and Switchboards
Consolidated Car Heating Co.
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

Switches, Tee Rail
Ramapo-Ajax Corp.

Switches, Track (See Track Special Work

Tampers, Tie
Railway Trackwork Co.

Tapes and Cloths (See Insulating Cloth, Paper and Tape)

Tee Rail Special Track Work
Ramapo-Ajax Corp.

Telephones and Parts
Elec. Service Supplies Co.

Telephone & Telegraph Wire
American Steel & Wire Co
John A. Roeblings Sons Co.

Arc Weld Rail Bonds

AND ALL OTHER TYPES

Descriptive Catalogue Furnished

American Steel & Wire Company

New York Boston Pittsburgh
Chicago Cleveland Denver
U. S. Steel Products Co
San Francisco Los Angeles Portland Seattle

"The Standard for Rubber Insulation"

INSULATED WIRES and CABLES

"Okonite," "Manson," and Dundee "A" "B" Tapes

Send for Handbook

The Okonite Company

The Okonite-Callender Cable Company, Inc.

Factories, PASSAIC, N. J. PATERSON, N. J.

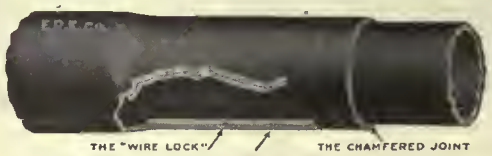
Sales Offices: New York Chicago Pittsburgh St. Louis Atlanta Birmingham San Francisco Los Angeles Seattle

Pettingell-Andrews Co., Boston, Mass.
F. D. Lawrence Electric Co., Cincinnati, O.
Novelty Electric Co., Phila., Pa.

Can. Rep.: Engineering Materials Limited, Montreal.
Cuban Rep.: Victor G. Mendoza Co., Havana.

Only reliable products can be continuously advertised

ELRECO TUBULAR POLES



COMBINE

Lowest Cost Lightest Weight
Least Maintenance Greatest Adaptability

Catalog complete with engineering data sent on request.

ELECTRIC RAILWAY EQUIPMENT CO.
CINCINNATI, OHIO
New York City, 30 Church Street

ANACONDA from mine to consumer

Rod, Wire and Cable Products

ANACONDA COPPER MINING COMPANY
THE AMERICAN BRASS COMPANY
General Offices - - 25 Broadway, New York

ANACONDA TROLLEY WIRE

THE WORLD'S STANDARD

"IRVINGTON"

Black and Yellow
Varnished Silk, Varnished Cambric, Varnished Paper

Irv-O-Slot Insulation Flexible Varnished Tubing
Insulating Varnishes and Compounds

Irvington Varnish & Insulator Co.
Irvington, N. J.

Sales Representatives:

Mitchell-Rand Mfg. Co., N. Y. Prehler Brothers Inc., Chicago
E. M. Wolcott, Rochester White Supply Co., St. Louis
I. W. Levine, Montreal Clapp & LaMoree, Los Angeles
A. L. Gillies, Toronto Martin Woodard, Seattle
Consumers' Rubber Co., Cleveland

Efficient Bus Heating
with
The N-L Venti-Duct Heater

THE NICHOLS-LINTERN CO.
7960 Lorain Ave. Cleveland, Ohio

NAUGLE POLES

WESTERN & NORTHERN CEDAR

NAUGLE POLE & TIE CO.

59 E. MADISON ST. CHICAGO ILL.

New York · Columbus · Kansas City · Spokane · Vancouver · Boston

ELECTRICAL WIRES and CABLES

ROEBLING

John A. Roebling's Sons Co., Trenton, N. J.

SAMSON SPOT WATERPROOFED TROLLEY CORD



Trade Mark Reg. U. S. Pat. Off.

Made of extra quality stock firmly braided and smoothly finished
Carefully inspected and guaranteed free from flaws.
Samples and information gladly sent.

SAMSON CORDAGE WORKS, BOSTON, MASS.



Gets Every Fare

PEREY TURNSTILES or PASSIMETERS

Use them in your Prepayment Areas and Street Cars

Perey Manufacturing Co., Inc.
101 Park Avenue, New York City

The DIFFERENTIAL CAR



Standard on 60 Railways for

Track Maintenance
Track Construction
Ash Disposal
Coal Hauling
Concrete Materials
Waste Handling
Excavated Materials
Hauling Cross Ties
Snow Disposal

Use These Labor Savers

Differential Crane Car
Clark Concrete Breaker
Differential 3-way Auto Truck Body
Differential Car Wheel Truck and Tractor

THE DIFFERENTIAL STEEL CAR CO., Findlay, O.



Type R-11
Double Registra

International Registers

Made in single and double types to meet requirements of service. For hand or foot, mechanical or electric operation. Counters, car fittings, conductors' punches.

The International Register Co.
15 South Throop Street, Chicago, Illinois



"Bates Poles Outlive the Bond Issues that Buy Them"
BATES POLES AND STRUCTURES
Bates Expanded Steel Truss Co.
General Offices and Plants
EAST CHICAGO, INDIANA, U. S. A.

NACHOD & UNITED STATES SIGNAL CO., INC.

LOUISVILLE, KY.
BLOCK SIGNALS
FOR
ELECTRIC RAILWAYS
HIGHWAY CROSSING SIGNALS



RAILWAY UTILITY COMPANY

CAR COMFORT WITH
UTILITY
HEATERS
REGULATORS
VENTILATORS

2241-2247 Indiana St.
Chicago, Ill.
Write for Catalogue
1328 Broadway
New York, N. Y.

GOLD CAR HEATING & LIGHTING CO.

220 36th St., Brooklyn, N. Y.

ELECTRIC HEATERS WITH OPEN COIL OR ENCLOSED ELEMENTS
THERMOSTAT CONTROL—VENTILATORS
WRITE FOR NEW CATALOGUE



RAMAPO AUTOMATIC RETURN SWITCH STANDS FOR PASSING SIDINGS
TEE RAIL SPECIAL WORK
MANGANESE WORK A SPECIALTY
SALES OFFICES AT ALL WORKS
Main Office, HILLBURN, N.Y.



STUCKI SIDE BEARINGS

A. STUCKI CO.
Oliver Bldg.
Pittsburgh, Pa.

H B LIFE GUARDS

PROVIDENCE FENDERS

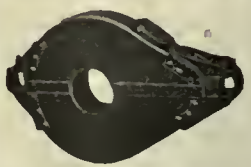
Manufactured by
CONSOLIDATED CAR FENDER CO., PROVIDENCE, R. I.
General Sales Agents
WENDELL & MacDUFFIE CO., 110 E. 42nd St., N. Y. C.

PRETTYMAN PRESERVED P27 FOREST PRODUCTS

CREOSOTED

Railroad Cross-ties; Switch-ties; Bridge Timbers; Construction Timbers; Mine Timbers, Lumber; Piling; Poles; Posts and other Forest Products

J. F. Prettyman & Sons
Wood Preserving Plant
Charleston, S. C.



CHILLINGWORTH

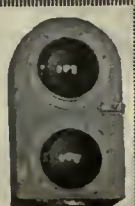
One-Piece Gear Cases

Seamless—Riveteless—Light Weight
Best for Service — Durability and Economy. *Write Us.*

Chillingworth Mfg. Co.
Jersey City, N. J.

Chapman Automatic Signals

Charles N. Wood Co., Boston



Coin Counting and Sorting Machines

FARE BOXES

Lever-Operated and Slip Change Carriers

The Cleveland Fare Box Co.
Cleveland, Ohio
Canadian Cleveland Fare Box Co., Ltd., Preston, Ont.

ALPHABETICAL INDEX TO ADVERTISEMENTS

Page

A

American Brake Shoe & Foundry Co., The 33
American Brass Co., The..... 43
American Bridge Co..... 41
American Car Co.....46-47
American Electrical Works.... 41
American Steel & Wire Co..... 43
American Steel Foundries..... 4
Anaconda Copper Mining Co.... 43

B

Babcock & Wilcox Co..... 37
Bates Expanded Steel Truss Co. 44
Beeler Organization 36
Bemis Car Truck Co..... 37
Bethlehem Steel Co..... 41
Boston Elevated Railway..... 39
Brill Co., The J. G.....46-47
Buchanan & Layng Corp..... 36
Budd Wheel Co..... 10
Byllesby Eng. & Management Corp. 37

C

Carnegie Steel Co..... 34
Central Alloy Steel Corp..... 26
Chillingworth Mfg. Co..... 44
Cincinnati Car Co..... 17
Cleveland Fare Box Co..... 44
Collier, Inc., Barron G..... 32
Columbia Machine Works, The.. 34
Consolidated Car Fender Co.... 44
Consolidated Car Heating Co... 44

D

Day & Zimmermann, Inc..... 36
Differential Steel Car Co., The.. 44
Du Pont de Nemours & Co., Inc., E. I. 25

Page

E

Eagle-Ottawa Leather Co..... 20
Electric Equipment Co..... 39
Electric Ry. Equipment Co.... 43
Electric Service Supplies Co... 9

F

Faile & Co., E. H..... 36
Ford, Bacon & Davis..... 36
"For Sale" Ads..... 39

G

General Electric Co..... 22
Gold Car Heating & Lighting Co. 44
Goodyear Tire & Rubber Co., The, 18-19
Graham Bros....Insert 27-28-29-30

H

Hale-Kilburn Co..... 37
Haskelite Mfg. Corp....Back Cover
"Help Wanted" Ads..... 39
Hemphill & Wells 36
Heywood-Wakefield Co..... 31
Holst Englehardt W..... 36
Hubbard & Co..... 37

I

Illinois Motive Equipment Co.. 37
Illinois Steel Co..... 8
International Register Co..... 44
International Steel Tie Co., The. 7
Irvington Varnish & Insulator Co. 43

J

Jackson, Walter 24, 34
Jeandron, W. J..... 34
Johnson Fare Box Co..... 38

Page

K

Kelker, DeLeuw & Co..... 36
Kuhlman Car Co.....46-47

L

LeCarbone Co..... 34
Leece-Neville Co..... 16
Linn & Marshall, Inc..... 30
Lorain Steel Co..... 41

M

McClellan & Junkersfeld..... 36
McGraw-Hill Book Co..... 35

N

Nachod and U. S. Signal Co.... 44
National Brake Co., Inc..... 23
National Pneumatic Co..... 15
National Ry. Appliance Co..... 41
Naugle Pole & Tie Co..... 43
New York, City of, (Dept. of Plants and Structures) 39
Nichols Lintern Co..... 43
Nuttall Co., R. D..... 35

O

Oakite Products, Inc..... 34
Ohio Brass Co..... 5
Okonite-Callender Cable Company, Inc., The..... 43
Okonite Co., The..... 43

P

Perey Mfg. Co., Inc..... 43
Positions Wanted and Vacant... 39
Prettyman & Sons, J. F..... 44

Page

R

Railway Track-work Co..... 37
Railway Utility Co..... 44
Ramapo Ajax Corp..... 44
Richey, Albert 36
Roebling's Sons Co., John A.... 43

S

St. Louis Car Co..... 21
Samson Cordage Works..... 43
Sanderson & Porter..... 36
Searchlight Section 39
Smith Heater Co., Peter..... 37
Standard Steel Works Co..... 38
Star Brass Works..... 41
Stevens & Wood, Inc..... 36
Stone & Webster..... 36
Stucki Co., A..... 44
Studebaker Corp. of America, The.....Insert 11-12-13-14

T

Timken Roller Bearing Co., Front Cover

U

Una Welding & Bonding Co.... 37
Universal Lubricating Co..... 37

W

"Want" Ads 39
Wason Mfg. Co.....46-47
Westinghouse Electric & Mfg. Co. 2
Westinghouse Traction Brake Co. 6
Wharton, Jr. & Co., Inc., Wm. 41
"What and Where to Buy," 40-42-45
White Eng. Corp., The J. G.... 36
Wish Service, The P. Edw..... 37
Wood Co., Chas. N..... 44

WHAT AND WHERE TO BUY—Continued from page 42

Testing Instruments (See Instruments, Measuring, Testing, etc.)

Thermostats
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter

Ticket Choppers and Destroyers
Elec. Service Supplies Co

Tie Plates
Illinois Steel Co.

Ties and Tie Rods, Steel
American Bridge Co.
Carnegie Steel Co.
International Steel Tie Co.

Ties, Wood Cross (See Poles, Ties, Posts, etc.)

Tires
Goodyear Tire Co.

Tokens
Johnson Fare Box Co.

Tongue Switches
Wm. Wharton, Jr. & Co.

Tools, Track & Miscellaneous
American Steel & Wire Co.
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
Hubbard & Co.
Railway Trackwork Co.
Ramapo-Ajax Corp.

Towers and Transmission Structure
American Bridge Co.
Bates Expanded Steel Truss Co.
Westinghouse E. & M. Co.

Track Grinder
Railway Trackwork Co.
Ramapo-Ajax Corp.

Track, Special Work
Columbia Machine Works & M. I. Co.
Ramapo Ajax Corp.

Trackless Trolley Cars
Brill Co., The J. G.
St. Louis Car Co.

Transfer Tables
American Bridge Co.

Transformers
General Electric Co.
Westinghouse E. & M. Co.

Treads, Safety Stair, Car Step
Cincinnati Car Co.

Tree Wire
Okonite Co.
Okonite-Callender Cable Co

Trolley Bases
R. D. Nuttall Co.
Ohio Brass Co.

Trolley Bases, Retrieving
R. D. Nuttall Co.
Ohio Brass Co.

Trolley Bases
Brill Co., The J. G.
Westinghouse E. & M. Co.

Trolley Material, Overhead
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Trolley Wheel Bushings
Star Brass Works

Trolley Wheels (See Wheels-Trolley)

Trolley Wire
Amer. Electrical Works
American Brass Co.
American Steel & Wire Co
Anaconda Copper Min. Co.
Roebling's Sons Co., J. A

Trucks, Car
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Cummings Car & Coach Co.
St. Louis Car Co.

Trucks, Motor
White Company

Truss Planks
Haskelite Mfg. Corp.

Tubing, Yellow and Black Flexible Varnish
Irvington Varnish & Ins.

Turbines, Steam
General Electric Co.
Westinghouse E. & M. Co.

Turntables
American Bridge Co.
Elec. Service Supplies Co.

Turnstiles
Elec. Service Supplies Co.
Perey Mfg. Co., Inc.

Valves
Ohio Brass Co.
Westinghouse Tr. Br. Co

Varnished Papers and Silks
Irvington Varnish & Ins. Co.

Ventilators, Car
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Heating Co.
Nichols-Lintern Co.
Nat l. Ry. Appliance Co.
Railway Utility Co.
St. Louis Car Co.

Vestibule Linings
Haskelite Mfg. Corp.

Welded Rail Joints
Railway Trackwork Co.
Una Welding & Bonding Co.

Welders, Portable Electric
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Welders, Rail Joint
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.

Welding Processes and Apparatus
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Welding, Steel
Railway Trackwork Co.
Una Welding & Bonding Co.

Welding Wire
American Steel & Wire Co.
Railway Trackwork Co.
Roebling's Sons Co., J. A.

Welding Wire and Rods
Railway Trackwork Co.

Wheel Guards (See Fenders and Wheel Guards)

Wheel Presses (See Machine Tools)

Wheels, Car, Steel & Steel Tire
American Steel Foundries
Bemis Car Truck Co.
Carnegie Steel Co.
Illinois Steel Co.
Standard Steel Works

Wheels, Trolley
Columbia Machine Works & M. I. Co.
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
R. D. Nuttall Co.
Star Brass Works

Wheels, Wrought Steel
Carnegie Steel Co.
Illinois Steel Co.

Whistles, Air
Ohio Brass Co.
Westinghouse E. & M. Co
Westinghouse Traction Brake Co.

Wheels, Steel Disc
Budd Wheel Co.

Window Guards & Fittings
Cincinnati Car Co.

Wire Rope
American Steel & Wire Co.
Roebling's Sons Co., J. A.

Wires and Cables
American Brass Co.
American Electrical Works
American Steel & Wire Co.
Anaconda Copper Min. Co.
General Electric Co.
Okonite Co.
Okonite-Callender Cable Co. Inc.
Roebling's Sons Co., J. A.
Westinghouse E. & M. Co.

Help Your Operators to be good Transportation Salesmen



Unobstructed vision, maximum seat comfort, and modern equipment assist them in providing an improved type of service which is readily salable

The Brill 1928 Model meets the modern requirements of the operating men as well as the public

Every detail was carefully considered as to its part in providing a type of car which would

First, prove attractive to the public from the standpoints of appearance, comfort and noise reduction.

Second, reduce power consumption and permit a rate of acceleration and braking in keeping with modern traffic requirements, due to its light weight and improved type equipment.

Third, provide transportation men with equipment which would contribute in no small way to the efficiency of their service.

Consequently, the full vision windshield, the Brill No. 1006 operator's spring-upholstered seat, adjustable for both height and leg room, and the use of automatic treadle doors, electro-pneumatic door and brake control are included in the Brill 1928 Model Electric Car.

BRILL 1928 Model

Keep abreast of other traffic with Brill 1928 Model cars

Acceleration of latest type electric car measures up to requirements of modern city traffic

In performance test conducted recently with the Brill 1928 Model Electric Car, the rate of acceleration greatly exceeded what might be considered normal requirements. In fact, the maximum rate obtained was almost three times that normally employed on most systems, which demonstrates the ability of this new type electric car to keep abreast of other forms of transportation.

The possibilities for improved schedule speeds may, therefore, be added to the other outstanding features of the Brill 1928 Model Electric Car — improved appearance, comfortable riding qualities, minimum noise, and low power consumption.

Write us for facts and figures on performance

Electric Car

The J. G. Brill Company
Philadelphia

American Car Company
St. Louis

The G. C. Kuhlman Car Co.
Cleveland

Wason Mfg. Company
Springfield, Mass.











Light weight cars o Los Angeles Railway

80 cars of the type shown above have been built by this company in its own shops. PLYMETL side panels were used on this entire lot—the detailed construction being clearly indicated in the three progress pictures at the left.

This operator, like scores of other leading companies throughout the country, recognizes not only the importance of light weight cars in promoting operating economy, but also the value of PLYMETL in securing maximum strength combined with minimum weight in a street car body.

The adoption of HASKELITE and PLYMETL will save over 900 lbs. dead weight in a typical street car on the basis of a 7-cent fare, the equivalent of carrying over 800 "deadhead" passengers a year. May we send you the weight comparisons which prove this statement?

Haskelite Manufacturing Corporat

133 West Washington Street, Chicago

PLYWOOD
HASKELITE
PLYMETL

Railway Representatives:

Economy Electric Devices Co., 37 W. Van Buren Chicago

Grayson Bros., 600 LaSalle Bldg., St. Louis, Mo.

Railway & Power Engineering Corp., Toronto, C Canada

ERJ11-26-Gra

PLYMETL SIDE PANEL

ELECTRIC RAILWAY JOURNAL

raw-Hill Publishing Company, Inc. DECEMBER 3, 1927 Twenty Cents per Copy

HOUSTON PUBLIC LIBRARY
HOUSTON, TEXAS.

MOTOR WHEEL is always looked to for the foremost wheel developments.

The greatest improvement in bus and truck wheels is Spoksteel. Motor Wheel has combined the strength of *high carbon forged steel* with the convenience, quiet and attractiveness of clean spoke-type construction.

A test set will prove overwhelmingly convincing on wheel endurance and tire economy.

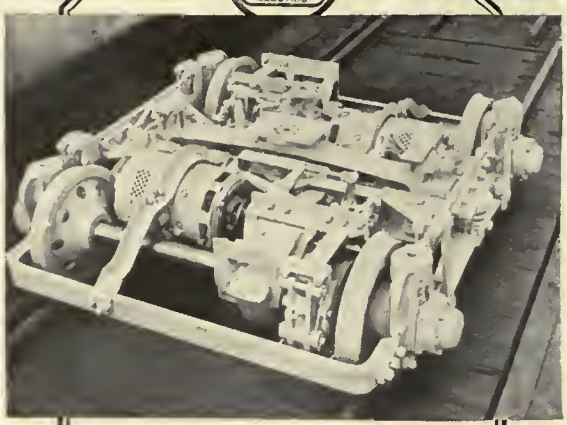
MOTOR WHEEL CORPORATION
LANSING, MICHIGAN



Spoksteel
by
Motor
Wheel







Quicker on the Get-away

THE W-N Drive gets away at the flash of the signal to GO —it speeds up schedules and in congested districts beats the automobile.

Its lighter weight, low starting friction and the Westinghouse easy control, all contribute to a faster, smoother acceleration that allows surprisingly quick handling without discomfort to passengers.

Many street railway officials have acclaimed it as the answer to the increasing problem of the faster handling of traffic with ample safety and with a greater riding appeal to the public.

W-N Drive advantages

- Lowest steps
- Faster acceleration
- Quiet operation
- Motors spring born
- Gears run in oil
- Greater clearance
- Lighter weight
- Lower maintenance

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in All Principal Cities of the United States and Foreign Countries

MEMBER AERA 1927

Westinghouse

X96409

MORRIS BUCK
Managing Editor
JOHN A. MILLER, Jr.
Associate Editor
CLARENCE W. SQUIER
Associate Editor
CARL W. STOCKS
Associate Editor

ELECTRIC RAILWAY JOURNAL

CHARLES GORDON, *Editor*

HENRY W. BLAKE
Senior Editor
GEORGE J. MacMURRAY
News Editor
G. W. JAMES, Jr.
Assistant Editor
PAUL WOOTON
Washington Correspondent
ALEX McCALLUM
Editorial Representative
London, England

Vol. 70
No. 23

Pages
1011-1048

CONTENTS

DECEMBER 3, 1927

Editorials 1011

Improved Service Pays in Eastern Virginia 1014
In little more than a year, the Virginia Electric & Power Company, under Stone & Webster management, has completely reversed public opinion in Richmond, Norfolk, Portsmouth and Petersburg.

Closed Top for Double-Deck Bus 1020

Public Service of New Jersey Has Extensive Telephone System 1020

London Is Establishing a Policy on Transit Expansion 1021
Report of advisory committee urges establishment of common fund and common management for all properties in London district. Public control considered also necessary.

Houston Electric Company Makes Good Its Promise. 1023
Delivery of twenty new cars including many features designed to make them attractive and comfortable represent fulfillment by company of promises made at time fare was increased.

Electric Railway Pension Plan 1026
By E. C. McDONALD.
Some practical suggestions for setting up a sound retirement plan for the employees of a railway company.

The Readers' Forum 1028

Maintenance Data Sheets 1029

Maintenance Notes 1031

New Equipment Available 1031

Association Activities 1032

News of the Industry 1033
Service Readjustments in Providence 1033
More Reports in Chicago 1033
1928 Model Proclaimed a Winner in Brooklyn 1035

Recent Bus Developments 1040

Financial and Corporate 1041

Legal Notes 1044

Personal Mention 1045

Manufactures and the Markets 1047

Keeping Up WITH THE FORDS

SEVERAL days before the new Ford graced the show rooms in cities throughout the country, the 1928 model Birney car paraded on the streets of Houston and the 1928 model Brill car was exhibited in Fulton Street, Brooklyn, before thousands of interested spectators and passers-by.

The idea back of the Houston car, together with a complete description of its construction, is presented in an article in this issue. There is also in this issue an account of how the people of Brooklyn took to the new idea in street cars in these days when the public demands something more in transportation than merely a vehicle which will take you there and bring you back. An article on the design and construction of the car being tried out in Brooklyn will be published next week.

Don't fail to read these accounts of the latest steps being taken to meet modern transportation requirements in street car design, and of how the public responds to this evidence of electric railway progress.

McGRAW-HILL PUBLISHING COMPANY, INC.
Tenth Avenue at 36th Street, New York, N. Y.
New York District Office, 285 Madison Ave.

JAMES H. McGRAW, President
JAMES H. McGRAW, JR., V.-P. and Treas.
MALCOLM MUIR, Vice-President
EDWARD J. MEHREN, Vice-President
MASON BRITTON, Vice-President
EDGAR KOBAK, Vice-President
C. H. THOMPSON, Secretary

WASHINGTON: National Press Building
CHICAGO: 7 S. Dearborn Street
PHILADELPHIA: 1600 Arch St.
CLEVELAND: Guardian Building
ST. LOUIS: Bell Telephone Building
SAN FRANCISCO: 883 Mission Street
LONDON: 6 Bouverie Street, London, E. C. 4

Member Associated Business Papers, Inc.
Member Audit Bureau of Circulations

Cable Address: "Machinist, N. Y."

Publishers of
Engineering News-Record
American Machinist
Power
Chemical and Metallurgical Engineering
Coal Age
Coal Age News
Engineering and Mining Journal
Ingeniería Internacional
Bus Transportation
Electrical Railway Journal
Electrical World
Industrial Engineering
Electrical Merchandising
Radio Retailing
Construction Methods
Electrical West
(Published in San Francisco)
American Machinist—European Edition
(Published in London)

The annual subscription rate is $4 in the United States, Canada, Mexico, Alaska, Hawaii, Philippines, Porto Rico, Canal Zone, Honduras, Cuba, Nicaragua, Peru, Colombia, Bolivia, Dominican Republic, Panama, El Salvador, Argentina, Brazil, Spain, Uruguay, Costa Rica, Ecuador, Guatemala, Chile and Paraguay. Extra foreign postage to other countries $3 (total $7 or 29 shillings). Subscriptions may be sent to the New York office or to the London office. Single copies, postage prepaid to any part of the world, 20 cents.

Change of Address—When change of address is ordered the new and the old address must be given, notice to be received at least ten days before the change takes place.
Copyright, 1927, by McGraw-Hill Publishing Company, Inc.
Published weekly. Entered as second-class matter, June 23, 1908, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Printed in U. S. A.

BETTER RAIL, BETTER TRANSPORTATION

Nothing added, nothing omitted:—

Here is a complete editorial from a recent issue of this paper. It's too good not to be repeated:—

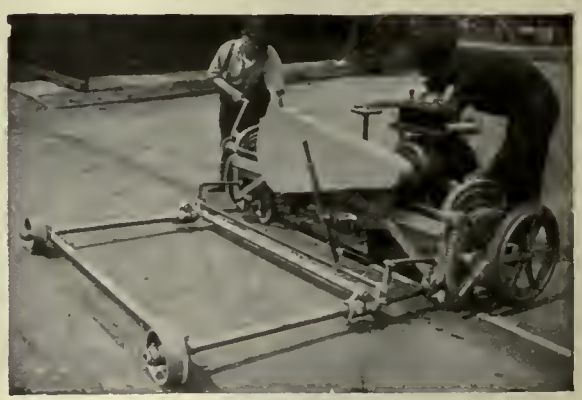
"Good Cars Deserve Good Track

WITH the trend toward better accomplishment in railroad operation one item is receiving too little consideration—the track. Strenuous effort is being made to improve public relations through the use of better appearing and riding cars and other means of sales appeal. But, alas, the track is down in the dirt and in a fair way to be overlooked or given scant attention. It requires no detailed analysis or proof to show that this is short-sighted, and particularly so for the interurban railway. A rough track shakes a good car to pieces and even a good car makes the bad track still worse.

Aside from the mechanics of the problem, which determines cost, rough track drives away the passenger. Instances can be cited without number to prove this, but the following is typical: An executive of a large city system has occasion to use an interurban road to another large city and the necessary pass to permit his free use of the electric line. This system is well equipped with the most modern of cars, which would furnish a most enjoyable ride were it not for a rough track. This executive, rather than submit to the rough-riding track, takes the steam train and pays his fare. If the electric railways cannot sell their wares to members of their own fraternity, how can they hope to stimulate public patronage? There is nothing more terrifying than a high-speed interurban car lurching from side to side."



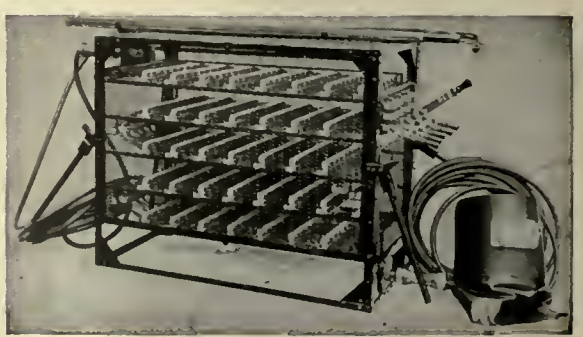
Eureka Radial Rail Grinder



Vulcan Rail Grinder



Reciprocating Track Grinder



"Ajax" Electric Arc Welder

Bulletins?

Railway Track-work Co.

3132-48 East Thompson Street, Philadelphia

AGENTS:

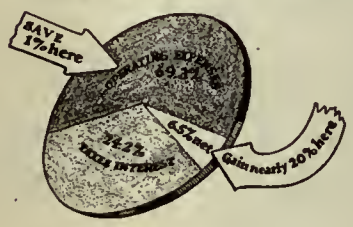
Chester F. Gaftor, 30 Church St., New York
Chas. N. Wood Co., Boston
Electrical Engineering & Mfg. Co., Pittsburgh
H. F. McDermott, 208 S. LaSalle St., Chicago
P. W. Wood Railway Supply Co., New Orleans, La.
Equipment & Engineering Co., London
Frazer & Co., Japan

2252

BETTER RAIL, BETTER TRANSPORTATION

DOLLARS AND SENSE!

Fewer line breaks are essential to increased net income. For only by reducing line breaks to the minimum can fast, reliable, rider-attracting service be given, and operating costs reduced.



Editorial in October 22 issue of
ELECTRIC RAILWAY JOURNAL

Putting Line Maintenance on a Business Basis

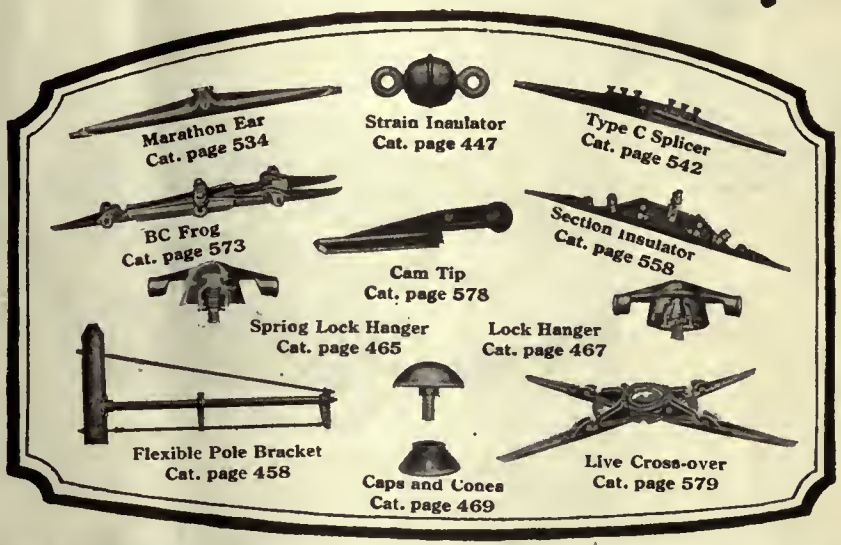
DISCUSSION of trolley wire failures has been avoided in some quarters, like a plague or a hidden sin, although the resulting delay is very evident and can only give the public a more unfavorable impression of street car service. Each break is spectacular to a degree, and stands out to patrons of the road like an advertisement of non-reliability From an economic standpoint, each break is extremely costly in car delay, loss of revenue and accident contingency

However, despite the lack of publicity, overhead maintenance on many properties has advanced to such a point that the familiar cry of "trolley down" and the thrilling dash of the emergency crew to the scene is now a rare occurrence. On these roads preventable wire breaks do not exist, because the wire is repaired before the breaking point is reached.

To the mind of the operator of each road, the overhead plant resolves itself into the contact wire alone. Some managements judge efficiency of the line department only by the rapidity with which breaks can be repaired. Little or no cognizance is taken by them of the number of failures, their causes and the car mileage operated. A better way of judging efficiency in respect to trolley wire breaks should be by the number of preventable breaks in direct ratio to the number of car-miles traveled. Certain data make it seem that this figure should be in the neighborhood of one failure for every 1,000,000 car-miles traveled. With this figure or the A.E.R.E.A. suggested average of 0.5 break per single-track mile as a basis of comparison operators can readily compare the efficiency of their overhead plant.

Many properties are now establishing records for uninterrupted service which were thought impossible a few years ago. These roads have lowered their trolley breaks to such a point that practically all that occur are due to agencies beyond the control of the overhead department. It is suprising to note that these results are being obtained at less total cost than with the "rush out and pick up" method.

What is possible on these properties is possible on all. The speed of the emergency crew must surrender to the accuracy of frequent inspection and adequate renewals, and thus lay the bogey of the trolley down to rest with the other "it can't be done's."



Isn't the Answer Inspections Plus Good Line Materials?

ELECTRIC RAILWAY operators everywhere will agree with the Journal's editorial reproduced at the left. It is *timely* as well as constructive. It emphasizes a phase of operation that, under present conditions, is of major importance from both the dollars *and* sense standpoint.

Careful and frequent inspections are undoubtedly needed to prevent overhead failures. And the advantages of this practice have been demonstrated by some of the largest and the smallest properties in the country. New records have been established in preventing line breaks—many of which were formerly considered unavoidable.

It is a matter of experience with many electric railways, where these records are being made, that it takes *both* good materials and periodic inspections to reduce line breaks. One property which recognizes these two factors has in the last three years reduced line breaks from 800 to 45 per year.

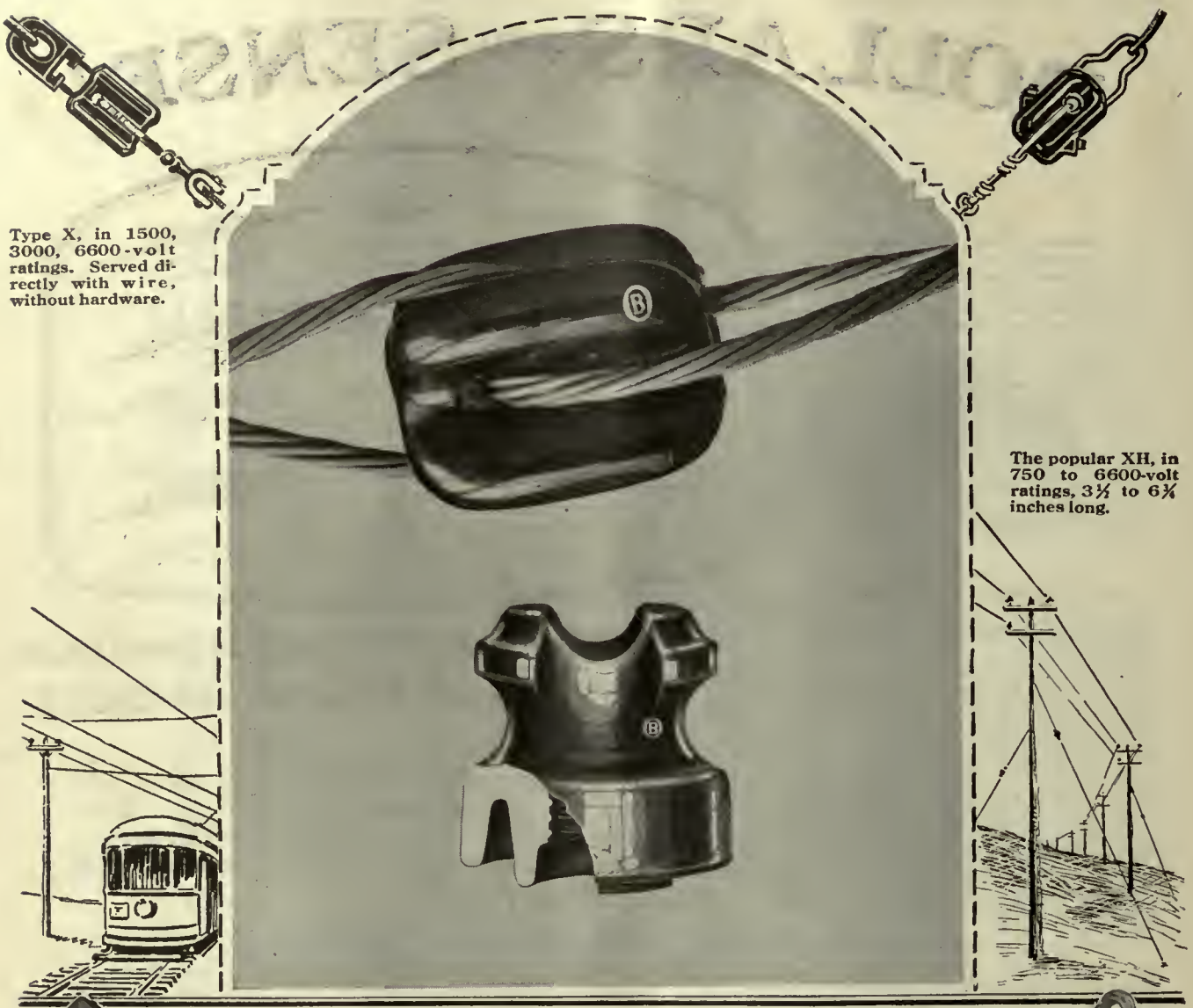
In the great majority of cases, it will also be found that where service betterment is acknowledged to be good business, O-B Line Materials are the first choice as a necessary factor in attaining this result.

Ohio Brass Company, Mansfield, Ohio
Dominion Insulator & Mfg. Co., Limited
Niagara Falls, Canada
7678

Ohio Brass Co.

PORCELAIN INSULATORS
LINE MATERIALS
RAIL BONDS
CAR EQUIPMENT
MINING MATERIALS
VALVES

SALES OFFICES: NEW YORK CHICAGO PHILADELPHIA PITTSBURGH CLEVELAND SAN FRANCISCO LOS ANGELES



Type X, in 1500, 3000, 6600-volt ratings. Served directly with wire, without hardware.

The popular XH, in 750 to 6600-volt ratings, 3½ to 6¾ inches long.

High Tension Porcelain

Pays on Low Voltage

MORE and more railway men have come to the use of O-B strain insulators for guy wires, dead-ends and cross spans. Why? Because they have learned by experience that it pays to use high tension porcelain as the insulation on low voltage.

And O-B strain insulators add virtues of their own to the desirable characteristics of high tension porcelain. For instance, the X-shape provides a long leakage path between strand wires. The porcelain is so shaped that the insulator is light in weight. Thick flanges, with round corners, make O-B insulators rugged. They can stand more rough handling and abuse than they are likely to get. They are easy to serve with the strand wire.

For complete information and for hardware fittings for all kinds of strain work, see pages 85-93 and 446-454 in your big, blue-covered O-B No. 20 catalog.

Ohio Brass Company, Mansfield, Ohio
Dominion Insulator & Mfg. Co., Limited
Niagara Falls, Canada
465H

Ohio Brass Co.

PORCELAIN INSULATORS
LINE MATERIALS
RAIL BONDS
CAR EQUIPMENT
MINING MATERIALS
VALVES

SALES OFFICES: NEW YORK CHICAGO PHILADELPHIA PITTSBURGH CLEVELAND SAN FRANCISCO LOS ANGELES

IN COLOR



N the next issue of the Electric Railway Journal will appear the first of a series of eight inserts on paved track "style" as used in Cincinnati, Boston, Detroit, Philadelphia, Kansas City, Cleveland, Washington and Buffalo. These eight cities have been selected from our list of over 200 users of Steel Twin Ties because they are in the half million population class and because the group is representative as to design, intensity of traffic, and extensive usage. The inserts will be printed in three colors, and will appear twice each month until the entire series has been published.

In presenting these inserts, it is our idea to put into the hands of Electric Railway Executives and Engineers the data and information that caused so much comment at our exhibit during the AERA Convention.

THE INTERNATIONAL STEEL TIE CO.
Cleveland, Ohio

STEEL TWIN TIE TRACK
THE BASE OF MODERNIZATION

"One-Wear"—No Repair



To last as long as any wheel without a single visit to the shops for re-turning is the "One-Wear" ideal.

Made practical in the Davis "One-Wear" Steel Wheel by the use of special heat-treated wheel metal.

Ordinary steel makes an ordinary wheel. Only its special composition makes the Davis Steel Wheel "One-Wear" in performance as well as in name.

AMERICAN STEEL FOUNDRIES

NEW YORK CHICAGO ST. LOUIS



In the "Good Old Days"

and To-day:

'Member back in the so-called "good old days" when no one but the motorman knew where the car was going? The well-mutilated old tin sign that hung on the car didn't reveal its secret to anyone.

Hence everyone would hail every car and then ask whither it was bound. The motorman usually lost both his voice and his patience after the two hundredth daily inquiry. The service was slowed up and schedules all shot to pieces.

Not so anymore, however, when Hunter-Keystone Signs are used. They "Tell the public where you're going" at a glance. So no one need stop the car except to get aboard. This both speeds up service and helps to maintain regular schedules.

Let us give you complete particulars of the long line of ride-selling Keystone Car Equipment. Send for Catalog No. 7.



Hunter-Keystone Signs

They consist of specially printed roller curtains which are turned or regulated by a small crank handle, so that any one of the 10 or more destination names are made to appear. They are mounted in sheet steel cases or may be built into the car structure. They advertise your service, establish routes and facilitate rerouting.

Home office and plant at 17th & Cambria Sts., PHILADELPHIA; District offices at 230 So. Clark St., CHICAGO; 50 Church St., NEW YORK; Bessemer Bldg., Pittsburgh; 88 Broad St., Boston; General Motors Bldg., Detroit; 316 N. Washington Ave., Scranton; Canadian Agents, Lyman Tube & Supply Company, Ltd., Montreal, Toronto, Vancouver.

ELECTRIC SERVICE SUPPLIES CO.

MANUFACTURER OF RAILWAY, POWER AND INDUSTRIAL ELECTRICAL MATERIAL

Keep the roadway CLEAR



Broom Lifting Mechanism

Roller-Bar Drive Chain

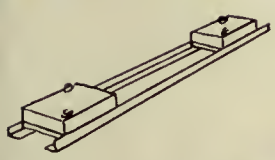
Blocked cars collect no fares

Hundreds of railways located in the heavy snow belt rely on Cummings Snow Sweepers to keep the rails clear, and maintain schedules during the season when the public depends most upon street railway service. The long broom clears both rails and fifteen inches additional outside of each track. The case hardened roller bar and detachable link steel chain drive make for long life and low maintenance. Brooms can be lifted to clear unusual obstacles.

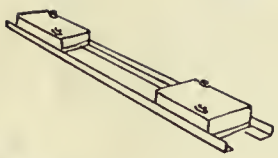
CUMMINGS CAR AND COACH CO.

Successor to McGuire Cummings Mfg. Co.

111 W. Monroe St., Chicago, Ill.



LASTING SMOOTHNESS



A powerful factor in selling rides

The Dayton Mechanical Tie Co.

DAYTON, OHIO.

Lasting Smoothness

A powerful factor in selling rides

Can you merchandise transportation over the handicap of rough track?

To an extent, of course, but it is unquestionably a high hurdle to get over. Rough track will seriously vitiate the effect of all the money you spend for fine rolling stock.

Hence, your plans for betterment must include track rehabilitation.

And when you start, don't be satisfied with anything less than Dayton Tie Track.

It is economical to lay, and once laid it stays smooth for years. In the 16 years since their inception, no track laid on Dayton Ties has ever failed. Maintenance has been so low as to virtually disappear.

In over 150 cities, Dayton Ties have proved their merit.

Dayton Tie Track is always Smooth

THE DAYTON
MECHANICAL TIE CO.
DAYTON, OHIO



ATLANTA



NP

More Treadles for Atlanta

This year's 66% increase in the use of NP Treadle Exit Doors has been accounted for, not only by adoption in new cities, but by increased use in cities where the treadle has already been tried out. With 101 cars previously equipped with treadles in Atlanta, Ga., for example, the purchase of 39 new installations proves how well they like this method of providing "circulating load."

NATIONAL PNEUMATIC COMPANY

Executive Office: Graybar Building, New York

General Works: Rahway, New Jersey

CHICAGO
518 McCormick Building

MANUFACTURED IN TORONTO, CANADA, BY
Railway & Power Engineering Corp., Ltd.

PHILADELPHIA
1010 Colonial Trust Building

The Time Elem



From the written reports of inspectors on a famous Kentucky property, "Magnetic equipped":

"Auto cut out of safety zone into track. Ran within 6 inches of car but motorman applied his magnetic and saved accident."

"Auto ran around in front of car but magnetic saved accident."

"Auto came out from behind another auto within 20 feet of car. Magnetic was all that saved accident."

"A woman walked in front of car at Lafayette Hotel. Motorman used his magnetic brake and stopped within 6 inches of the woman."

"Saved an accident at —— and —— by use of magnetic. Auto cut into car."

The Cincinnati Duplex Air and Magnetic Brake is one of the important features of the Cincinnati Balanced Lightweight Car and is an integral part of the new Cincinnati High Speed Truck.

ent

- in accident prevention - -

Frequently it happens that a few seconds of time can do more to avert an accident than many feet of space, especially when the hazard is between moving vehicles.

Hence much can be done in the way of accident prevention by increasing the rate of retardation of the electric car.

On actual test the Cincinnati Duplex Air & Magnetic Brake increased the rate of retardation of an average double truck car (weight 39,000 lbs.) by 53% at 19.5 mph, and by 66% at 45 mph, a saving in stopping time of 2.4 and 6 seconds respectively.

Far sighted operators will find much to think about in such figures. They point a way to improved service without increase in operating liabilities, and they have a direct bearing on the traffic problem.



We quote on the opposite page from operating reports on a typical "Magnetic equipped" property in Kentucky. Full technical data is available on request.

Cincinnati Car Company
Cincinnati, Ohio

CINCINNATI BALANCED LIGHTWEIGHT CARS

—still a step ahead of the modern trend!

Safeguard and Accelerate Traffic

Automatic Signals by providing proper spacing of cars or trains, reduce trip time and enable more cars to be operated with consequent safety.

Interlocking installations at terminals and at grade crossings eliminate unnecessary stops and assure route continuity by means of signal indications.

Highway crossing protective devices of the flashing light, automatic flagman, or audible type, or combination of same, are a dependable insurance which soon pays off the investment.

Power operated remotely controlled switches are being used economically to accelerate Electric Railway traffic.

These Systems are products of the

TRADE MARK **Union Switch & Signal Co.** TRADE MARK

SWISSVALE, PA.





One of the Variable Load Brake equipped cars of the Brooklyn City Railroad Company. These cars are serving dependably, making possible short, uniform stops, a saving of time, and consequently a superior service.

Don't DRAG along with the traffic ·····Lead it!

INTENSIVE service has come to be recognized as the only solution to city traffic problems. Modern light weight cars, in hundreds of instances, have satisfied their operators with their dependable service in running the gauntlet of traffic congestion.

With these modern light weight cars and the Westinghouse Variable Load Brake, uniform stopping distances are possible . . . an obvious time saving feature and a valuable aid in holding position in traffic lanes.

Eliminating guesswork on the part of the operator as to the retarding force necessary as passenger load changes, the Westinghouse Variable Load Brake automatically accepts this responsibility, giving the operator the braking confidence he needs in bucking modern traffic complications.

The Westinghouse Variable Load Brake assures uniform stopping distances from day to day and year to year, with full, half-full or empty cars.

More complete information, relative to the numerous advantages of the Westinghouse Variable Load Brake, may be had through any of our conveniently located offices, or by addressing the Westinghouse Traction Brake Company at Wilmerding.

WESTINGHOUSE TRACTION BRAKE CO.

General Office and Works, Wilmerding, Pa.

2221

WESTINGHOUSE TRACTION BRAKES



Mr. Sawyer practices what he preaches

How to meet the demand for transportation has always been foremost in the mind of Mr. Sawyer. He knows it's a big job—he's fought for it—he's an outstanding advocate of modern electric railway cars.

Wherever Mr. Sawyer travelled officially as President of the A.E.R.A. during the past year he preached the need of raising the standards of public transportation — improved cars were an essential requirement.

And Mr. Sawyer practices what he preaches. For as President of the East St. Louis Railway he purchased for his property, the "Rail-Sedan 48," product



of the Quality Shops. If you were at Cleveland, you saw it.

St. Louis can help you toward quieter operation, higher speed, increased frequency, greater reliability, more courteous service—higher net returns—and above all, ride-selling appeal — those fundamental pre-requisites of better transportation.

St. Louis Car Co.

Quality Cars



Carriers of Crowds

PEOPLE must work close together in order to work efficiently. They carry on this work in skyscrapers, concentrating, on a few hundred feet of ground area, activities which otherwise would occupy several square miles.

Since they congregate at the same hour, it is essential that they *travel* together. It would no more be possible or economical for each to travel by a separate carrier than it would be for each to occupy a separate business building. Community of interest demands a more common occupation of both street conveyances and structures.

The skyscraper, in short, is the common business home. The street car is the common carrier, and it has proved impossible to carry so many people so conveniently, dependably, and economically by any other means.

General Electric helps the railways carry crowds by supplying equipment that keeps their cars in operation. It manufactures and carries in stock at all times a complete line of repair parts and maintenance materials for every type of railway carrier equipment.

The General Electric Company's Repair Parts Service is to the Railway Industry what street cars and skyscrapers are to the community at large—a central, concentrated, and convenient means of performing service in the most efficient, standardized, and economical manner.

330-45

GENERAL ELECTRIC

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review
Published by McGraw-Hill Publishing Company, Inc.
CHARLES GORDON, *Editor*

Volume 70 New York, Saturday, December 3, 1927 *Number 23*

Evidence Continues to Accumulate

DURING the past two years increasing attention has been given to the condition of electric railway equipment. Railway managements throughout the country are generally alert to the need for retiring obsolete cars and to the advantages to be obtained from cars that are more in keeping with present-day conditions and transportation standards.

When it comes to the matter of transposing this interest into action, however, a somewhat different situation is encountered. The operating management finds difficulty in presenting the case for new cars in terms convincing to the men who put up the money. Some of the most important advantages of new cars are intangible. These include such items as their effect on the public's general attitude toward the company, the attitude of trainmen toward their jobs and the effect which improved equipment may have on the volume of riding.

Much information and data have become available to prove that these advantages have actually accrued in many cities that have gone ahead with car improvement programs. Two articles in this issue, recording the experiences of the Virginia Electric & Power Company and the Houston Electric Company, give eloquent testimony in favor of improved equipment.

Though it is a difficult selling job to convince a conservative group of directors that new cars on their property would more than pay their way, the volume of evidence which has been accumulated in favor of the case for better electric railway equipment is imposing. The alert railway manager who collects and digests this evidence can use it effectively in the effort to get better equipment on his own property.

Demand for Beauty and Style Are Irresistible

FOR nineteen years Henry Ford built and sold a standard product. Embodied were many of the virtues upon which the engineers like to dwell. Its cost of operation was relatively low. Its maintenance cost was likewise below that of more pretentious cars. The Ford established a good reputation as a car that would take you there and bring you back. Its entire appeal in comparison with competitive automobiles was on the basis of reliability and economy.

When it was brought out there was little reason to worry much about the appearance of the Ford car. It was essentially democratic in its unpretentiousness. But nineteen years is a long time measured in terms of the changes in taste that have taken place since the turn of the century.

Public transportation has undergone many changes, some more fundamental than any yet experienced by the automobile. From horse car, to cable, to trolley was indeed a metamorphosis. Accompanying this development there came about, also, changes in people's travel habits and ways of living. It is no exaggeration to say that the growth of modern cities as we know them today was dependent on having available fast, dependable and economical public transportation.

The wheel of time never stops in its turning. The very causes of change are themselves affected by the forces which they loosen. So it is with the automobile, creator of the demand for greater speed and luxury.

Just as the automobile itself worked a revolutionary change in the travel habits of this and other countries, so has it in turn been affected by the march of time. Even Ford, the original and last disciple of economy and utilitarianism as the guiding principles in automobile manufacture, succumbs at last to the demand for beauty and style in travel.

Utility and economy are still the determining factors in the success of a public transportation system. But the growing demand for style and speed seems to be irresistible, and affects every means of travel—public as well as private.

Small Systems Can Be Made to Pay

PROGRESSIVE management, in the final analysis, must be recognized as the necessary impetus to make a property, large or small, show a satisfactory earnings statement. With it the problem is relatively easy; without it little or nothing can be accomplished. Mere bigness in itself is a help in making both ends meet, but even on the largest properties mistaken policies frequently have led to disaster. On the small property there is little, if any, leeway. The management must be ever on the alert to grasp every means of improving conditions and must leave no stone unturned to uncover sources of revenue and means of reducing expense.

The record of the Durham Public Service Company, as published in the issue of this paper for Nov. 26, is of particular interest to managements in small cities confronted with difficult problems. Here is a city of only 45,000 inhabitants, with a railway system that had been allowed to run down until there was not even enough revenue to cover operating expenses, let alone provide for deferred maintenance. Some car routes were rendering a needed service, while others showed heavy traffic losses with little hope of regaining the business.

Faced with this serious situation the management made a number of radical changes. Some of the car routes were abandoned entirely and the cost of track maintenance saved. Buses were substituted and so routed that they gave a service that pleased the patrons. New territory which had developed was served by the buses, and special routing in the rush hours permitted greater efficiency in handling many of the workers, besides keeping them off the regular cars. Modern cars were introduced on the rail lines that were retained. These made a marked improvement.

Best of all, these changes brought increased revenue. From a low point of $147,074 gross revenue in 1925, the

revenue has gone up to more than $200,000 for the current year, an increase of 36 per cent. The changes were so well planned that the operating expenses in the same time have increased only from $152,919 to $177,840, or 17 per cent. Accordingly the net result has changed from an operating deficit of $5,845 in 1925 to a balance of $22,410 for this year.

Results of this sort are an effective refutation of the statement so often made that an electric railway system—or in fact any public transportation—cannot succeed in a small city. It shows that quality of service and a willingness to give the public what it wants and needs are the real bases of success, and that the handicaps incident to small size can, at least in some instances, be overcome.

An Interesting Parallel Drawn by Mr. Mencken

H L. MENCKEN, editor of the *American Mercury*, has done utilities, but particularly the electric railways, a real service in an article "The Banks and Their Customers," contributed by him to the Baltimore *Sun*. It may at first seem a far cry from this subject to that of the utilities, but Mr. Mencken makes the transition with all the writing grace so characteristic of the man.

After saying that no man wants to put his money into a bank that is not making money he slips over into a consideration of the matter of the right of the United Railways & Electric Company to an adequate fare. He admits he is discreetly silent about the original financing of the company, but he asks why the desire predominates in some quarters to try to remedy a situation he considers bad by making the stock worth even less than it is today and by carrying the funded debt along with it. The questions he wants answered are how the company is going to improve its service without money, and how is it going to get any money without selling either stock or more bonds. According to Mr. Mencken, the villainy of corporations, and especially public service corporations, is greatly exaggerated. He thinks the Public Service Commission as a regulatory device sufficiently well endowed to sit on any predatory corporation impulses.

Similar things have been said before, but not just the way Mr. Mencken has done it. As he sees it the United Railways needs help out of the mud, not another shove into it. The point he makes is incontrovertible that if the United were better off it could afford to make all of the improvements its critics bawl for—and many more. It could get money for them at low rates. Its securities would be selling at higher prices. Investors would be eager to support it. Now they steer clear of it and it is pegging along on one leg, and "the marvel is that it is able to operate its cars at all."

The company does, of course, need help badly. There is no doubt of that, although there is a little bit of exaggeration in the Mencken manner, particularly in his colorful portrayal of the railway's plight. But all that he says is essentially true. One cannot, as the late Elbert Hubbard said, feed calves a mixture of chalk and water and expect them to thrive. Yet far too often the public utility calf has been expected to thrive on just such substitute for a substantial fodder in the form of an adequate fare. The difficult job is to make the men understand this who try to do business on a working capital of $70. And, as Mr. Mencken says, they are the fellows who make a great deal of noise.

Knoxville Should Watch Its Step

EMINENTLY fair is the opposition of the Knoxville Power & Light Company, Knoxville, Tenn., to the threatened program of competition by bus by the Knoxville Rapid Transit Company. The railway has stated its case clearly and forcefully, but with no hint of retaliation. It is going ahead with its program of improvements just as if nothing had happened and proposes to proceed with its plan to cut its rates for light and power.

Some persons might be inclined to ask what the one has to do with the other. Theoretically, nothing; but practically, everything. If the city were playing as fair with the company as the company is with the city, the city would not even entertain the bus proposal, much less advance it beyond first reading in the council, as was recently done. This is not a defense of the company; it is just common sense. There is no service that the proposed bus operator can perform which the railway at Knoxville cannot perform equally as well, if not actually better. It is co-ordination, not competition, that is needed.

If the city of Knoxville is not prepared to play fair with its railway, then what assurance has the newcomer that the city will play fair with him? It may seem like anticipating events to assume that the city has it in mind to do anything but play fair with its railway, but cities have been foolish in the past. The railways have passed through the cycle of the horse car, the cable car and the trolley, each in turn. They must progress where they are to survive.

Substitution and competition do not spell progress. They spell ruination. Knoxville can have what it wants, but it is not on the right road when it does not first exhaust the means which it has at hand in securing what it wants from a responsible agent. And the responsible agent in this case is the Knoxville Power & Light Company. The city knows what it has got in that institution. It does not know what it may get. But even if the company which is seeking a foothold in that city were able to live up to every promise which it has made the city would still be the loser. That is an incontrovertible fact.

Piedmont Case Involves Question of Jurisdiction of I.C.C.

MANY reasons exist for interest on the part of both steam railroads and electric railways in the oral arguments to be presented before the Interstate Commerce Commission at Washington on Dec. 9 on the application of the Piedmont & Northern Railway for a certificate authorizing the construction of two extensions of its electric lines in North and South Carolina. The program of that road calls for the expenditure of more than $20,000,000. It is an important case on that account alone. But more than that, very grave questions about the authority of the commission appear to be at stake. At least three steam railroads are opposed to the granting of the application, and the examiner for the commission who heard the case originally has recommended that the application be denied.

It is a long story, the history of this case, but some of the facts regarded as essential to an intelligent understanding of the matter are worth recapitulating. The Piedmont & Northern, an electric road tied in with the Duke power interests, has a network of tracks which serve virtually the entire rich Piedmont area of South

Carolina. The road seeks to penetrate the valuable textile and tobacco region of North Carolina. The case arose when the Interstate Commerce Commission asked the company if it intended to seek the authority of that body to make the extensions. The road then filed its application. Some time later it sought to have the application dismissed, arguing that the commission was without jurisdiction. It held that it was not operated as a part or parts of a general railroad system and was therefore, by paragraph 22 of section 1 of the interstate commerce act, expressly excluded from the operations of paragraphs 18 and 21 of section 1, under which the commission grants certificates of convenience and necessity. Other points that it made, also points made by the opposition, were reviewed in ELECTRIC RAILWAY JOURNAL for Sept. 3, page 407.

Views similar to those of the electric railway appear to be held by the National Association of Railroad and Utilities Commissioners. That body contends the act of Congress creating the Interstate Commerce Commission eliminated spur tracks, electric interurbans and industrial sidings from the jurisdiction of the commission. The commission itself previously has been on record in rate cases that where the service on electric lines in interstate commerce was essentially local in character the problem of regulation was a local one. The question of "state rights" is even said to be involved.

Eminent counsel, headed by Charles Evans Hughes, will appear for the electric line. Regardless of the Interstate Commerce Commission decision, the case appears to be headed ultimately for the United States Supreme Court. Should the commission hold that it lacks jurisdiction, it seems likely that the steam lines will appeal. On the other hand, if the application is refused, as the commission's examiner has recommended, the Piedmont & Northern will undoubtedly appeal to the highest courts, after the case goes through the lower courts. The likelihood of similar situations arising in the future seems remote, but it does appear probable that the question of jurisdiction now raised will be settled once and for all.

Better Advertising Copy Is Better Selling

UNANIMOUS indorsement of the Better Copy Contest inaugurated by the Public Utilities Advertising Association is a foregone conclusion. For who is there with mind so sluggish that doesn't see the danger in advertising copy that either boasts vaingloriously, makes subtle comparisons or deteriorates into mere words? Advertising in the public utility field has been developing fast. It is to encourage continued development and to award recognition to outstanding advertisements that the Better Copy Contest, referred to elsewhere in this issue, is under way.

It is inconceivable in these enlightened days for any railway to presume to "carry on" without a well-planned advertising campaign—modest financially though it may of necessity be in some cases. Most companies realize that it pays to advertise when the messages contain ideas executed consistently and persistently. Still "mere" copy, no matter how often repeated, will not win the man in the street or the private automobile owner.

It is not intended that this should be a treatise on the elements of advertising copy, but the opening of this contest presupposes recognition that the fundamentals of advertising to sell rides or any other utility service are inherently the same as those for selling soap—that "rides" is a product the need of which the potential buyer must feel. But in addition to poising his copy from the merchandise angle, the utility advertising man must appreciate the psychology of the rider.

It is generally accepted as an advertising principle that suggesting one brand of goods for another won't win customers. Quality, service and even "super-service" must be sold. Advertising experts warn against selling the copy rather than the product, against demanding instead of inducing and against exaggeration and boasting. And herein is the epitome of good advertising appeal. At a recent round-table discussion advertising men expressed the view that 85 per cent of general copy today is bad, 10 per cent is good and 5 per cent excellent. It is to place utility advertising copy and especially railway advertisements definitely and unequivocally in the excellent class that electric railway men should get back of this movement to stimulate better advertising through this contest.

Avoid "Iron and Concrete" Mistakes

WHILE at a great distance from our own country, one of the best rapid transit systems in the world exists in Sydney, New South Wales, Australia. Being on the opposite side of the globe, it is difficult to conceive of rapid transit in such a far-off land, yet this Australian system, described in the Nov. 26 issue of this paper, is a model after which any city might profitably pattern.

Too often have designers of rapid transit systems lacked foresight. A few subways have been planned and built which were able to accommodate the population for several years, but often they have proved inadequate within a short period. Any subway line of New York City will serve as an example of this.

Constructed of steel and concrete as they are, it is difficult or impossible to alter stations and tracks to relieve congestion. The Sydney City Railway, aware of the fact, profited by the experiences and the mistakes of others and arranged the stations, tracks and crossings to permit the use of an increasing number of trains for years and years. Furthermore, extensions were planned at the outset to join the lines being built and the entire system was laid out accordingly.

Modern in every respect and embodying many new construction features, it portrays the result of long study and thought.

"Flyover" junctions to prevent crossing of tracks at grade are used extensively by the Sydney systems. In one station alone fourteen crossovers are used.

Stations, too, were planned for efficient operation and have been provided with sufficient tracks and island platforms to accommodate all trains without duplication of car routes. The Central Station, for example, has eight tracks and four platforms to handle the suburban and local lines of both directions. By way of comparison, the Times Square station on the west side line of the Interborough Rapid Transit Company and the Grand Central Terminal station on the east side line of the same system, handling more passengers than any other subway stations in New York City, each has but four tracks and only two island platforms. The Sydney stations are also characterized by large platforms and ramps for entrance and exit. They have been designed to handle a large number of passengers in excess of the present normal flow.

Designers of new rapid transit systems can well profit, as did the designers of the Sydney, Australia, system, by avoiding the mistakes committed by others in the past—mistakes sealed in iron and concrete, not to be corrected.



The latest type of car in Richmond is a distinct credit to the community

Improved Service Pays

in Eastern Virginia

In little more than a year the Virginia Electric & Power Company, under Stone & Webster management, has completely reversed public opinion in Richmond, Norfolk, Portsmouth and Petersburg

CORPORATE descendant of the first commercially successful street railway in the world, the Virginia Electric & Power Company has in a measure inherited the responsibility which attaches to a pioneer and to his progeny as well. Ever since that day in 1888 when admiring and awestruck citizens of Richmond saw Sprague's crude street car run past the historic Ballard and Exchange Hotel and on up Franklin and Bank Streets, they have expected and demanded much of their local transportation companies. Add to this a keen rivalry, not unmixed with jealousy, on the part of citizens of several communities served by a common utility company, sharply drawn social lines in an atmosphere of Southern aristocracy and growing industrial activity, the race problem, rugged, irregular topography presenting steep grades and necessitating circuitous routes, and there is formed a rough outline of the basic conditions with which it has been necessary to contend in the historic Virginia cities of Richmond, Norfolk, Portsmouth and Petersburg. These properties were for many years beset with public misunderstanding, bitterness and financial difficulties. Yet since July 1, 1925, when they were acquired by the present owners and organized into the

"Esprit de corps" is the direct object of the relations between management and employees of the Virginia Electric & Power Company. Here is a representative group of trainmen arrayed in their lightweight gray summer uniforms and white duck caps.



Virginia Electric & Power Company, there has been an almost complete reversal of public attitude toward the transportation company in each of these cities. Bitterness and bickering have given way to growing good will and understanding between the company and its patrons. As a direct result there is a marked improvement in the financial outlook for the property, and every indication that those who had faith in the possibilities of these transportation lines stand to profit substantially from their investment.

In determining the underlying reasons for this complete change in the situation, one needs to look little further than the present management's formula of "being doers of the word and not promisers," which has been so successfully applied by the same interests on several other Southern properties.

Going back for a moment to get a closer insight into the conditions which existed when Stone & Webster took hold of these properties in the Old Dominion, one must return to the general public attitude toward transportation in Richmond and its neighboring cities. During early promotional days there had been ill-advised over-construction of lines by competing companies, until the railway mileage was far out of proportion to the density of population. Inevitably, consolidations and receiverships followed; yet the public would not permit the discontinuance of any of the lines. Under the régime of the Virginia Railway & Power Company, the predecessor of the present company, the properties in Norfolk and Portsmouth had been acquired, and with them a rivalry between the citizens of Tidewater and Piedmont, Va., old as the state itself. Petersburg, 22 miles south of Richmond, had been part of the group long before the Tidewater utilities were added. The holdings also included the Richmond & Petersburg Electric Railway, an interurban line.





An example of results accomplished in the effort to make street cars in Richmond more attractive. An exit treadle is provided at the rear of the rehabilitated car

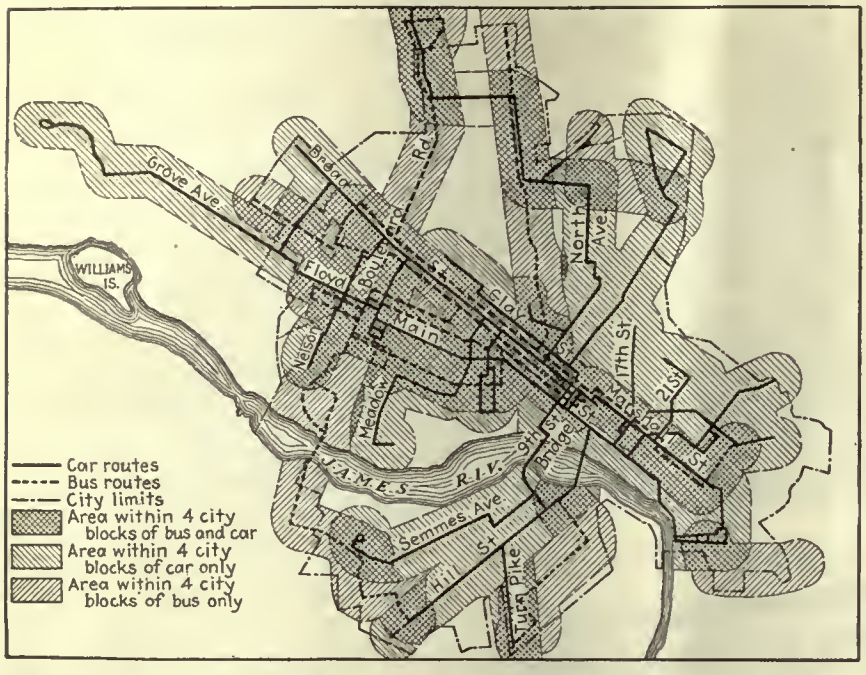
The situation of the property on July 1, 1925, was described as follows by an executive familiar with its history and details:

> Many operations had been performed on it and it had suffered many relapses, the consequence of which was that the public had grown weary of hoping that the patient would recover. The company had a valuation made of its physical properties, and succeeded in having the State Corporation Commission fix and recognize a fair value on each of its several railway divisions and on its entire light and power system. It also had been successful in having the matter of fares on its railway divisions taken out of the hands of the local city councils and placed under the jurisdiction of the State Commission, this latter move having been carried through the courts and finally confirmed by the Supreme Court of Virginia.

But as a corrollary to this litigation, ill feeling sprang up between the various city councils which resulted in deadlocking these bodies in the matter of franchise negotiations so that matters dragged in each of the several cities over a long period—since 1909 in Richmond. Meanwhile, the company also had been conducting a campaign against jitney and competing bus operation, which incurred the antagonism of many who found these vehicles convenient and rapid forms of transportation. To offset losses created by jitney and private bus line competition, a number of railway lines were abandoned, principally in Norfolk and Portsmouth, where the losses were greatest, and increased fares were urged and obtained through the State Commission, thus further vexing an already irritated public. To add fuel to the flames, a strike was called in 1922 on all the railway lines. This was won by the company. But again there was a bad aftermath. Unfriendly labor elements employed their influence in the various councils to the end that action on applications for franchises, rerouting, jitney elimination and other legislative matters was postponed and delayed. Public ill will accompanied the general confusion and the press added its note of censure. There was general dissatisfaction in the tidewater cities with a service that was being controlled and directed altogether from one city, Richmond.

In the midst of this travail was born the Virginia Electric & Power Company, under the executive management of Stone & Webster. The new management set about demonstrating once more—as it has already demonstrated in many other cities—that public support and co-operation, so essential to success, can be won through straightforward dealing and efficient operation despite past prejudices and misunderstandings. In the short period of little more than a year there has been worked a marked transformation in transportation conditions in these Old Dominion communities.

Soon after the new management took hold an executive vice-president was located in Norfolk to handle affairs in that city and in Portsmouth. A claim department was set up in the seaside city, thereby removing one of the old bones of contention, i.e., that Norfolk and Portsmouth claims were settled in Richmond. Further harmony was



Rerouted electric railway lines and co-ordinated bus routes give Richmond complete transportation coverage while eliminating needless duplication of service

attained by a rearrangement of the purchasing department so that purchases for the Norfolk territory are made by a local purchasing agent.

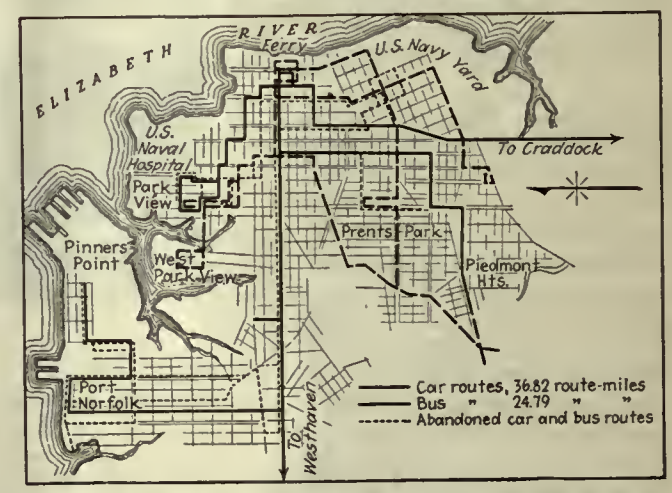
Making Richmond Riders Comfortable

With a deadlocked franchise controversy and stiff competition from an independent bus company, attributable largely to the city's bitterness over losing an earlier rate fight, the situation in Richmond was about as delicate as can be imagined. Added to this was an insistent demand for better service.

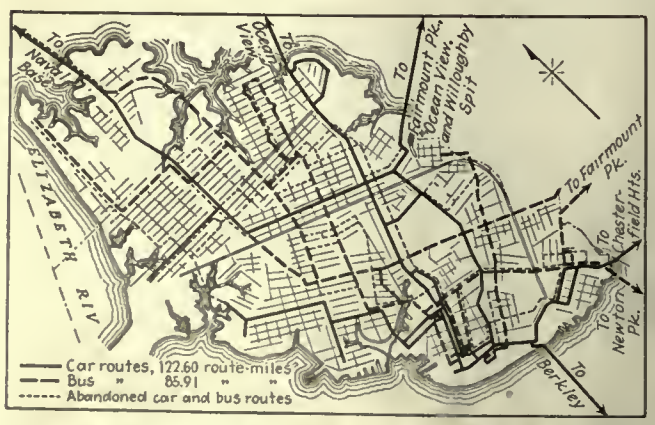
Reference to a map of the city reveals that it is spread over a large area with many irregular radiating avenues. The city is situated on the seaboard slope, so that the new residential section and retail districts are on a rolling plateau, from which to reach the financial and business districts one must descend gradients of from 6 to 8 per cent. In the western or new residential districts there is a fan-shaped area, the inhabitants of which have resisted all efforts to construct railway lines. Into this district went jitneys in large numbers and subsequently the Richmond Rapid Transit Company, the competing bus company.

Confronted with these local problems, the new management renewed franchise negotiations with the city on Sept. 1, 1925, for a united car and bus service, and about the same time, Sept. 12, 1925, purchased the Richmond Rapid Transit Company at a valuation determined by a citizens' committee. Leaving matters to take their course, a $1,500,000 plan for equipment rehabilitation and improvement was launched. Fifteen 40-ft. treadle-exit equipped 44-passenger, de luxe double-truck cars were ordered within three months after the new management assumed control. Following this improvement, a survey of the existing equipment showed that 40 double-truck cars built in 1911 were in such good condition that they could be remodeled. Work was started on 32 of these cars to convert them to one-man, treadle operation, at a cost of $4,500 per unit. A color scheme the exact duplicate of the fifteen new cars was adopted. In addition to installing new platforms and safety devices, air-brake and door valves were inclosed, and line switches replaced circuit breakers.

By acquiring the rolling stock of the Richmond Rapid Transit Company the management obtained 52 buses, all in fair mechanical condition and seating from 18 to 25 passengers each. These were completely overhauled and painted to conform with the color scheme of the new cars. This rehabilitation cost about $1,600 a unit. Fifteen new buses were added on Jan. 1, 1927, when unified service was inaugurated with a parade through the city. The company carried out its promise to provide better service with a unified system, by the operation of 106 cars in Richmond on the base schedule. The morning peak load is handled by 62 trippers and that of the evening with 81 extras, this representing an increased service in the rush hours of 58 and 76 per cent respectively. These routes in the normal period are served by fourteen units, with twelve extras in the morning and thirteen ex-



The route map of Portsmouth shows how the principle of rerouting and elimination of duplication was applied in that city



In Norfolk efficient transportation service for the community has been provided by the rerouting of some lines and the elimination of duplicate or circuitous routes



Here is an example of how the program of modernization was applied to the interior of Norfolk's "1100" type cars. Hard cane and wood seats gave way to leather-cushioned comfort

tras in the evening rush period, respectively 86 per cent and 93 per cent increase over the former service. On the five other routes which reach out into every nook and corner of the city and which encountered stiff gradients there are 28 buses in the base service. Ten additional buses are operated in the morning and eleven in the evening peak hours. An accompanying map shows how completely this service covers the city while at the same time eliminating much former duplication of routes and waste mileage. Rearrangement and rerouting of rail lines resulted in the abandonment of 5 miles of track and the construction of 10 miles of extensions.

Briefly stated, the franchise proposal included a unified system with 35 additional miles of bus routes giving a total of 106 unified miles of route for a maximum fare of 8 cents; a 7-cent car fare with 1-cent transfer car to bus, and an 8-cent bus fare. On May 25, 1926, the Richmond City Council granted a 30-year franchise, overriding the Mayor's veto and making the document official as of Aug. 19, 1926. Thus there was obtained in less than a year an agreement that had been sought since 1909.

A measure of the effect of the improvements made upon the patronage in Richmond is given by the following figures:

RICHMOND RIDING AND REVENUE FOR FIVE YEARS

	Revenue		Gross Riding
1922	$2,087,366		47,093,144
1923	2,493,541		56,074,296
1924	2,488,003		55,282,316
1925	*2,638,278		*53,081,943
1926	3,075,536	Car... 49,460,119 Bus... 6,678,352	56,138,471

* Sept. 15, 1925, the Richmond Rapid Transit Corporation buses were acquired.

When examining these figures, one must bear in mind a number of factors: Touring car jitney competition, in 1922, was reduced almost 400 per cent by an ordinance of June 8, 1922, which confined such operations to the western "fan" residential area not conveniently covered by street cars; a 6-cent fare until Sept. 1, 1926, a 7-cent fare thereafter; bus fare at 8 cents and 1 cent for trolley to bus transfer. The figures for the first five months of 1927 show a continued improvement:

RICHMOND GROSS RIDING BY MONTHS

	1927	1926
January	4,710,658	4,142,405
February	4,255,614	3,860,945
March	4,696,864	4,354,750
April	4,647,669	4,265,179
May	4,641,048	4,379,827
Total	22,951,853	21,003,106

Comparing these passenger totals with those of the revenue totals for the same five months period, i.e., $1,299,070 (1927) and $1,310,151 (1926), reveals an increase in riding and a slight drop in revenue, attributed to the more liberal transfer system and to the fact that improved bus facilities drew more riders in the residential districts. Bus riding in 1926 was 12 per cent of the total as against 18 per cent in the same five months of 1927.

Reversing Public Opinion in Norfolk

The situation in Norfolk was in some respects similar to that in Richmond. The predecessor company had been operating the property of the Norfolk Railway & Light Company, whose 99-year lease dates from June, 1906. Jitney competition was running wild all over the city—at one time there were 250 passenger cars and buses, with



The company's buses are housed in modern brick and concrete garages of this type

separate service for the colored population, the buses in this case manned by negro operators. This competition represented 25 per cent of the total traffic. Under date of July 18, 1921, an ordinance was drawn by A. Merritt Taylor, City Manager, which, though it contemplated the elimination of jitneys, included requirements for future track extension and maintenance expenditures which were considered by the company to be dangerous. In 1924, failing to obtain curtailment of bus competition, rail service was curtailed. This led the city to look with favor upon extension of the competing bus service. The situation became further involved by the company's plea for a further cut in service and its effort to get paving relief. Behind all this was the public's antipathy toward a Richmond-dictated operation.

This was about the situation when the new management took hold. The first step was the adoption of a policy of frank discussion of the wastefulness of competition and an effort to determine just what kind of a transportation system would be in the city's best interest. An ordinance was soon passed providing for unified operation of cars and buses. Some of the independent routes were purchased at values determined by the city.

On Oct. 26, 1926, an ordinance was passed which authorized the abandonment of 36.82 car route-miles. A rerouting and building program was undertaken which involved an expenditure of $750,000. As in the case of Richmond, particular attention was paid to the improvement of cars. Sixteen cars of the double-end, two-man type were converted for one-man operation with an exit treadle. Twin leather seats with air cushions replaced rattan-wooden seats. A 26-in. aisle was provided. Stanchions and grab handles of aluminum were installed, as were air-operated fare boxes and window wipers. The control was changed to the chair-level type K-75. Automatic slack adjusters and variable load brakes, concealed brake control and door-control piping and door engines set in cabinets over the doors are some of the other refinements on these cars. The rehabilitation cost per car was approximately $6,000. In addition to this rehabilitation, the company purchased ten new 43-ft. treadle-exit cars which were delivered in the late spring, and which included 35-hp. motors and genuine leather-upholstered twin-design spring seats, space 30-in. centers. The specifications also called for concealment of all control apparatus and valve piping. Electric heaters were installed in the valve boxes to prevent cold weather troubles.

Bus service was likewise modernized in Norfolk. There are now in use there twenty-five 29-passenger buses with treadle rear doors, plush or leather seats and metal shoe air brakes; five 25-passenger vehicles with similar equipment, and twenty-six 21-seat units.



Parades, in which civic leaders joined enthusiastically, marked the installation of new buses in Richmond and Petersburg

Experiments with the seating arrangement of the Birney cars in service on the property were made. This was dictated by dissatisfaction resulting from the mixing of white and colored passengers. Finally it was found that transverse seats on one side of the cars and a long bench on the other side were acceptable to the public. The operators on former negro buses were changed to white employees. The white patrons are now using these buses, particularly since they were equipped with rear treadle doors.

In the track construction, dirt and cinder ballast has been succeeded by crushed stone and slag. Bronze bonds, creosoted wood ties and twin steel ties, thermit welding and 122-lb. A.E.R.A. rail are being used.

A comparison of operating results in Norfolk for the past five years is given by the following figures:

NORFOLK REVENUE OVER FIVE YEARS

	Revenue from Transportation	Net After Operating Expenses	Vehicle-Miles
1922	$1,643,581	$483,713	5,465,310
1923	1,697,178	592,272	5,549,964
1924	1,581,650	529,348	5,429,982
1925	1,512,722	505,722	5,292,585
1926	*1,970,480	350,015	8,746,616

* Revenue from acquired buses $462,466.
Large drop in net due to deficit on these buses.

Notes: 1. 7 to 6 cents fare changed February, 1922.
2. June 10, 1923—6½-cent token, 7 cents cash, and 2½ cents school.
3. Bus earnings not a factor until 1926, when there were 3,425,096 bus-miles, representing 40 per cent of total mileage and carrying 21 per cent of passengers.

On Jan. 1, 1927, fares for adults were changed from 6¼ to 7 cents for one trolley zone, also from 5 cents on the negro and 7 cents on the white buses to 8⅓ cents (or three tokens for 25 cents). A $1.50 transferable weekly pass without restrictions was adopted. The effect of these changes is shown in the following tabulation:

NORFOLK PASSENGER REVENUE COMPARISON, JANUARY TO MAY, 1926-1927

	1927	1926	Increase 1927, Per Cent
January	$172,735	$145,952	18
February	160,967	147,995	9
March	181,010	160,392	13
April	188,935	164,103	15
May	191,636	169,745	13
	$895,283	$788,187	14

Note: Operating revenue: 75 per cent railway, 25 per cent bus.

GROSS RIDES IN NORFOLK, JANUARY TO MAY, 1926-27

	1927	1926*	Increase, Per Cent
January	3,095,356	2,637,737	17
February	2,869,338	2,699,668	6
March	3,149,323	2,955,386	6
April	3,291,905	2,999,034	10
May	3,069,494	2,751,223	12
	15,475,416	14,043,048	10

Notes: *1. In 1926 figures multiple zone rides were counted two or three times, against one count under new plan. This condition made extra rides 9.5 per cent of total in 1926.
2. Five months, 1926—Buses 39 per cent of mileage, 22 per cent rides. 1927—33 per cent bus-miles, 25 per cent rides.
3. Average gross passengers per bus-mile 2.2 to 3.6.
4. January, 1927, figures high due to fact that all jitneys had not been taken over in January, 1926.

Portsmouth Problem Difficult

In many respects the Portsmouth problem was the most difficult faced by the new management. The three outstanding factors were: Long controversy over paving on main thoroughfare; abandonment of three routes in 1924 authorized by State Commission because of tremendous bus competition, which was increased after the strike in 1922 by the participation of ex-carmen in bus operation; strong labor community and insistence by city that the old company comply with paving provisions of its franchise.

The new management offered $130,000 for the paving program and track construction. It purchased the independent bus operations, paying on the basis of physical valuation. In addition, many of the old operators were retained. In a little more than a year an ordinance was passed by the city council which provides for monopoly of transportation in the city, co-ordination of cars and buses, changes in rates of fare, and reduction of the paving obligation to the point where the company only furnishes the concrete foundation under its track area.



An abandoned single-track line in a high-grade residential section of Portsmouth has been replaced with a busy double-track line

Five new cars for one-man operation with exit treadles, genuine leather seats, K-75 chair-level control, air-operated fare boxes and safety car equipment were purchased. Portsmouth later was apportioned five of the 21-passenger buses purchased by the company. This new equipment had a strong effect in the complete reversal of public opinion toward the company.

As in the case of Richmond and Norfolk, a comparison of revenue for 1926 and 1927 shows the direct effect of the improvements that were made.

PORTSMOUTH OPERATING REVENUE

	1927	1926
January	$40,645	$18,657
February	35,838	17,009
March	39,283	17,830
April	40,053	18,779
May	41,098	18,149
	$196,917	$90,424

Note: No buses were operated until August, 1926.

REVENUE AND GROSS RIDES IN PORTSMOUTH

	Revenue	Gross Rides
1922	$200,735	3,794,393
1923	260,617	4,974,173
1924	219,285	4,241,174
1925	205,722	3,988,939
1926	310,920	4,585,027

Note: 1922, strike. 1923–1925, growing bus competition.

On entering the scene at Petersburg, a conservative old Southern city, with fine homes and with one highly



The new electric building and interurban terminal in Petersburg is a distinct civic improvement

restricted suburban residential section, the management found the Walnut Hill exclusive suburb residents objecting to the operation of a trackless trolley system. There was likewise a demand for a bus service to Colonial Heights.

Again the procedure was to act first and talk afterward. A bus service was established to Walnut Hill and Colonial Heights. Track extensions were made on Halifax Street and improvements made to the equipment of the safety cars.

The citizens responded on Nov. 16, 1926, through an ordinance effective Jan. 1, 1927, which extended the franchise 30 years, confined the paving obligation to restoration, and abolished bus competition on Halifax Street. The city approved an application to the Corporation Commission for an increase in fare from 6 cents to 6¼-7 cents with a 3½-cent school fare. This ruling abolished a second fare on a line serving Matoca, a suburb.

Meanwhile, the company addressed itself to improving the interurban service of the Richmond & Petersburg Electric Railway. A competitive bus line was purchased and co-ordinated with the rail service. At present, four round trips of the limited trains are replaced by five express buses on a 60-minute schedule for the 22 miles. The remaining limited trains are now on a 67-70-minute schedule. Fares are: Bus, 75 cents straight; railway, one way with transfer, Petersburg-Richmond, 60 cents; Richmond-Petersburg, 67 cents, 5 cents less if tickets are bought at terminals. A 50-ride book is sold for $16.50.

The following figures show the operating results in Petersburg during the five years from 1922 to 1926:

	Revenue	Gross Rides
1922	$193,086	4,248,783
1923	203,352	4,596,993
1924	183,963	4,011,854
1925	168,547	3,471,806
1926	154,800	2,898,942

With unified service and buses on the streets for the first time June 1, 1927, results for the first five months of 1927 in comparison with 1926 were as follows:

PETERSBURG REVENUE BY MONTHS, 1927 AND 1926

	1927	Bus Proportion	1926
January	$14,996	$4,145	$13,069
February	13,571	3,537	12,503
March	14,926	3,791	13,311
April	14,854	3,618	13,190
May	14,570	3,646	13,184
	$72,917		$65,257

The consolidated figures for the entire property show the combined effect of the changes that were made in these four cities. The comparison is between the first five months of 1927 and the corresponding months of 1925, just before the property changed hands.

TRANSPORTATION

	Gross Earnings 1927	Gross Earnings 1925	Net Earnings 1927	Net Earnings 1925
January	$517,459	$369,700	$149,656	$108,873
February	471,099	355,601	148,320	111,797
March	521,414	385,880	167,543	122,167
April	529,751	385,221	189,796	123,926
May	530,321	395,201	188,882	137,655
	$2,570,044	$1,891,603	$844,197	$604,419

These figures indicate an increase in gross of 36 per cent and in net of 40 per cent.

Closed Top for Double-Deck Bus

CLOSED-IN tops for the upper decks of its double-deck buses has been developed by Mitten Management, Inc. This provides complete protection from the weather. For experimental purposes one of the new tops has been placed on a Penn-Jersey Route 3 bus. If the top meets with the approval of bus riders and proves effective in operation it will be made standard equipment over the Penn-Jersey system wherever double-deck buses are used.

Penn-Jersey lines were chosen for this experiment for three reasons. The long open run over the bridge subjects passengers to unusual severity of wind and weather.



Upper deck of bus with closed-in top

Bridge service is in the nature of a "terminal-to-terminal" ride and does not require frequent loading and unloading as do the city lines. The bridge buses do not pass under any low viaducts along their routes.

If the Penn-Jersey experiment proves successful it will be followed by the appearance of fully inclosed buses on Route C, operating on Broad Street, Philadelphia, and on the entire city double-deck bus system whenever and wherever conditions will permit.

The new top has been developed in response to the suggestions of the regular riders of double-deck buses, who find upper-deck riding less attractive in winter weather than during the summer. Accordingly the opinion of passengers riding on buses equipped with closed-in tops will be sought with information blanks.

Public Service of New Jersey Has Extensive Telephone System

SEVENTY-FIVE thousand telephone calls daily made through 33 exchanges in various parts of the state of New Jersey with 2,500 extension stations represent the magnitude of the telephone business of the Public Service Corporation. In addition to the general exchanges, which are connected with 275 central telephone office trunks, Public Service has a number of special-type exchanges, such as dial exchanges at the Kearny and Essex stations, load dispatching exchanges of the electric generation department in the Newark Terminal building and in Burlington and telephone order-receiving systems in the commercial offices in Newark, Jersey City, West New York, Paterson, Passaic, Trenton and Camden.

London Is Establishing a Policy on
TRANSIT EXPANSION

Report of advisory committee urges establishment of common fund and common management for all properties in London district. Public control considered also necessary

LONDON, like New York, is seeking a way to encourage the improvement and extension of its local transit facilities. While the subject is an old one in London, little was done officially until the passage of the London traffic act in 1924. This authorized the Minister of Transport to appoint a traffic advisory committee to consider the subject. Up to this time the existing systems have been allowed to develop as best they might, a large part of the street railway system being operated by the County of London, and the greater part of the bus and underground railway system, with some of the street railways in the suburbs, being operated by private initiative under a common management.

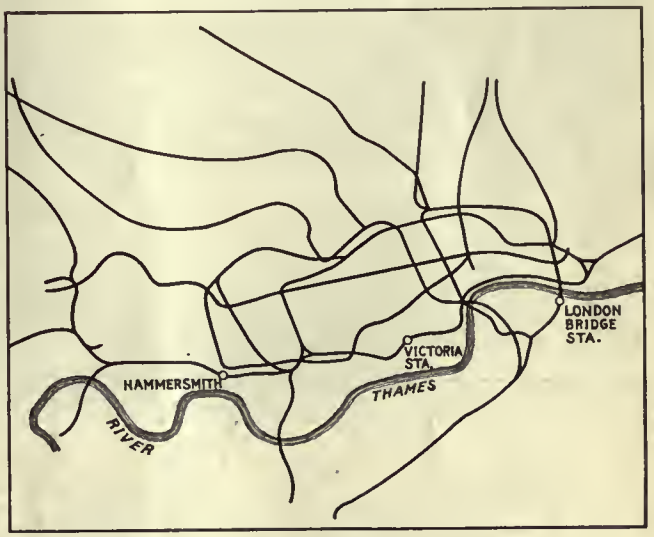
The act authorized the appointment of an advisory committee to report to the Minister of Transport on possible transportation improvements in the London Traffic Area. The ordinary membership is made up of eight representatives from the various boroughs and other districts served, two from the police and one each appointed by the Secretary of State and the Minister of Transport. Besides these regular members there are seven others, four representatives from the owners of the transportation lines and three from among their employees, to serve when matters of transportation were considered.

In its early inquiries into transport facilities in London, made some time ago, the committee found that additional means of transport, particularly underground railways, were greatly needed, especially in the north, northeast, east and southeast of London; that the present competitive methods were wasteful, uneconomic and unnecessary, and that all forms of public passenger transport under unified management, subject to public control, appeared to offer the only satisfactory and lasting solution to the problem of passenger transport in London. There still remained, however, the way of bringing about such a result. This is outlined in a report of the committee made public on Oct. 25, 1927. Its proposal, the committee explains, is by no means final. It is put forward as a basis of negotiation with all the authorities concerned, and after they agree it must then be approved by Parliament. In its opinion, if its proposal is accepted, the transportation undertakings concerned can be made self-supporting without any increase in the general level of fares now prevailing.

The basis of the proposal is the establishment of a so-called common fund and a common management for the various undertakings. The common fund is essentially a London plan, which has worked well for a number of years with the omnibus and tube railways in that city. It has brought to them most of the advantages of consolidation without a great many of its disadvantages. Under the common fund plan the bus and underground railway companies in the "Underground Group" pay their own operating expenses, interest and certain returns on their stocks, but then pool the remainder of their income into a fund, which is distributed between the constituent companies according to a definite plan. The result is that those lines which are most profitable help carry those which are not.

It is this principle of the common fund, not consolidation, that the committee recommends for the future in London. The ownership of the existing undertakings would remain with the present owners, whether they are municipalities or private companies, though possible exceptions to this principle or some variation of it may be necessary for the small bus operators because of the small interests which they severally represent.

While recommending the common fund system broadly, the committee recognizes that where a system in the past has been unable to meet its fixed charges, the extent to which those charges should rank in the revenue liabilities would have to be the subject of negotiation. Special treatment would also have to be given to the municipal properties, as the investment in them is represented by municipal loans rather than the usual form of capital issues.



Map of London's underground railways, with suburban connections

In connection with the constitution of the common fund, the committee also points out that as some margin of current revenue must be secured to establish a credit for raising additional capital for extension and development, it may be necessary to have legal authority to extend the period for the repayment of loans raised by the municipality, and that no party to the agreement should increase its revenue liability except under proper authority or increase its depreciation reserve or under-



Bus routes within the London district operated by the London General Omnibus Company

take any other agreement which would prejudice the constitution of the common fund except with the consent of the others or, in case of dispute, of arbitration. Provision should also be made for temporary financing as well as for some convenient uniform basis for calculating the reserve for depreciation and renewals of the several properties.

The committee points out that the various parties to the plan are of different degrees of financial strength and security. It would therefore be unfair to distribute the common fund, at any rate at first, in direct ratio to the capital of the different undertakings. A better plan, in its opinion, would be to select some past year as a "standard year," and distribute the common fund pro rata to the contributions which the different undertakings would have made to the fund in that year, though this rate of division might be modified later as the capital of the individual major divisions is built up. The balance remaining, after the payment of a reasonable return on the capital employed, should be used for any one of the following purposes: (a) To provide credit to attract new capital; (b) to carry out improvements to the existing undertakings; (c) to reduce fares and other charges; (d) to provide a general reserve against possible future bad years; (e) to finance temporarily new capital expenditures; (f) such other purposes that may be approved by the Minister of Transport.

The report points out that not only will a number of economies result from a common management as well as a common fund, but that a common fund really postulates a common management. Such a management, besides operating the property, would see that all of the undertakings are maintained in efficient order, and that adequate traveling facilities are provided for the public and that the combined undertakings are managed so that the earnings will be sufficient to meet all proper charges and to provide a reasonable return on the capital. The question of fares would also be negotiated by the management with the authorities.

While public control is necessary and assumed for the plan proposed, the report declares it should be simple and under one head, say under that of the Minister of Transport, rather than through various local authorities. Such a single authority also is in a better position to determine what additional traveling facilities are needed from time to time and should have authority to refuse permission for those that would conflict with the general plan.

The report also points out the need for a fair degree of permanency for any plan adopted and suggests a minimum period of 42 years. Otherwise, the report says, it will be difficult to raise the necessary capital to expand the system.

The report is signed by Sir Henry P. Maybury, chairman of the committee, and by fifteen of the other eighteen members. The three remaining members add individual comments. One of the three considers the plan "unsuitable, impracticable, and unfair" to the independent bus companies, and one who represented the main line railways and Metropolitan Railway did not sign because he wished to leave them free to dissent from the report if they wished. The third was prevented by illness from attending the meetings, but expressed himself as in general agreement with the plan.



The solid lines show the routes of the London County Council Tramways. The dotted lines in the suburbs show through connecting routes

Houston Electric Company

Makes Good Its Promise

Delivery of twenty new cars including many features designed to make them attractive and comfortable represents fulfillment by company of agreement made at time fare was increased

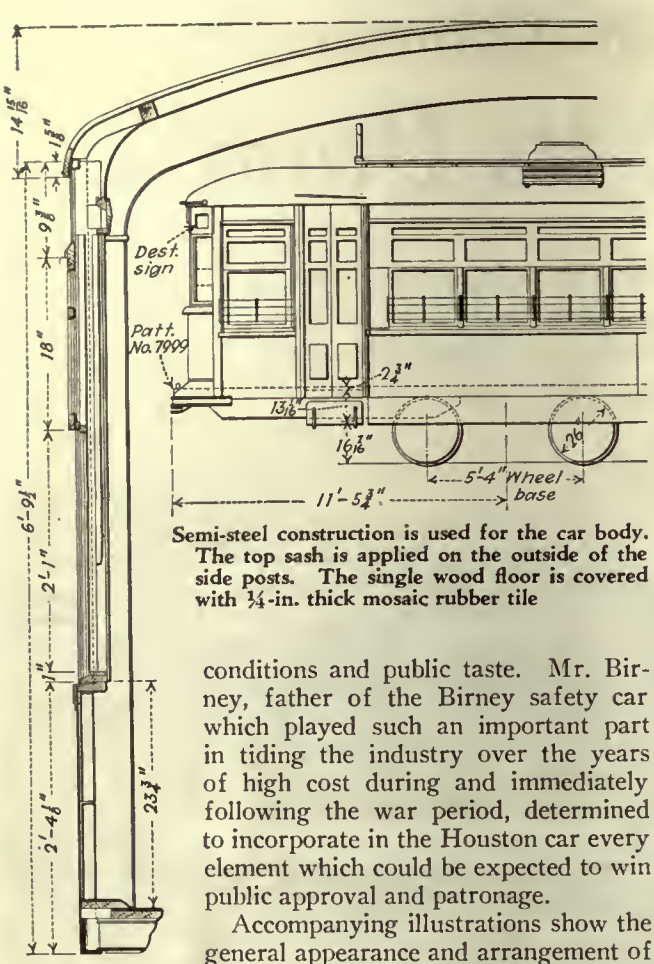


Three-quarter view of the new Houston car taken at the Cleveland convention, where it attracted much attention from railway men interested in improving the appearance of electric railway equipment. The method of carrying out the streamline painting and the use of double headlights are clearly shown. The colors are: blue below the belt rail, a red stripe along the rail and around the dash, with cream between the letterboard and the belt rail.

RECEIPT by the Houston Electric Company of the twenty de luxe single-end city cars recently built for this rapidly growing Texas seaport by the St. Louis Car Company marks the fulfillment of promises made to the Houston public a short time ago by the railway management. In fact, when the new cars were recently paraded before the eyes of an admiring citizenry the average man on the street had direct visual evidence that the local railway had not only lived up promptly to its agreement to make heavy investments in new equipment, but had succeeded in developing for Houston a public transportation vehicle in keeping with the energetic and progressive spirit of the city.

Thus the constantly growing co-operation between the public and its transportation company is beginning to show the full measure of its possibilities both for the development of the city and the improvement of local transportation service. Recent fare readjustments authorized by public officials, as recorded in the June 18, 1927, issue of ELECTRIC RAILWAY JOURNAL, were dictated not by an ill-advised, parsimonious, rabble-tickling attitude of splitting pennies, but on the business-like basis of permitting the company to charge a reasonable rate, provided the city could be assured of first-class, up-to-date transportation service that would represent full value for the fare charged. These conditions the company was entirely willing to accept. The cars just delivered, a sample of which was on exhibition during the recent convention in Cleveland, represent a sincere effort by the company to "go the limit" in providing for Houston the finest type of street car which it was possible to obtain.

The resulting cars represent the combined efforts of the Houston management, which is under Stone & Webster, Inc., executive direction; C. O. Birney, superintendent of car construction Stone & Webster, and the St. Louis Car Company to develop a car to fit 1928



Semi-steel construction is used for the car body. The top sash is applied on the outside of the side posts. The single wood floor is covered with ¼-in. thick mosaic rubber tile

conditions and public taste. Mr. Birney, father of the Birney safety car which played such an important part in tiding the industry over the years of high cost during and immediately following the war period, determined to incorporate in the Houston car every element which could be expected to win public approval and patronage.

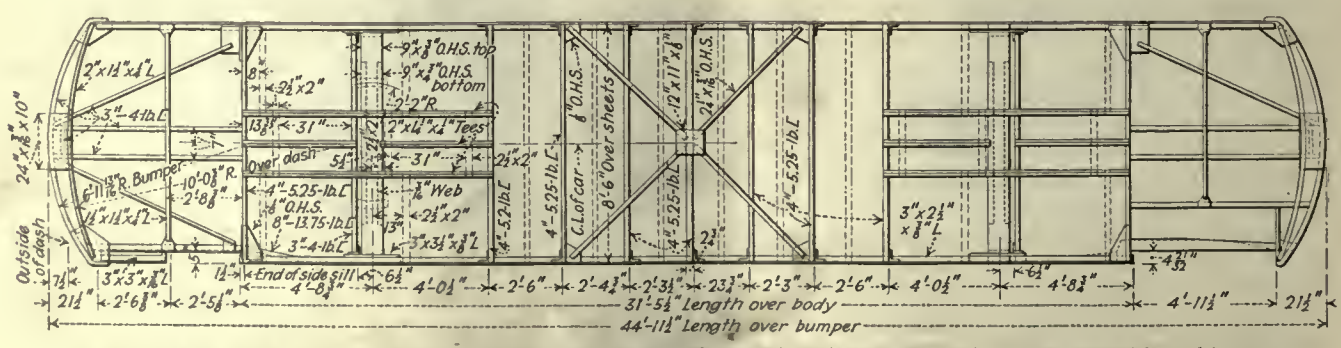
Accompanying illustrations show the general appearance and arrangement of the cars. They are 44 ft. 11½ in. long over all, 8 ft. 8½ in. extreme width, and 10 ft. high from rail to trolley base. The design is for one-man, single-end operation and seats 57 passengers. A treadle at the rear end automatically controls the exit door at that point. The cars weigh complete 36,000 lb. with four Westinghouse 510-A motors and St. Louis EIB-64 trucks. This weight is divided 18,400 lb. for the car body, 9,000 lb. for trucks and 8,600 lb. for equipment.

In determining the general lines and proportions of the body, every effort was made to give these cars a graceful, streamline appearance in keeping with the influence of the automotive vehicle on public taste. This effect is accented in the painting scheme through the use of horizontal bands of color running in unbroken lines around the entire car and across both the front and rear doors. A skirt around the bottom of the car helps to carry out this scheme by eliminating breaks in body lines which usually occur at doors, steps and bumpers. A comparatively flat arch roof helps in obtaining the effect desired. Double headlights at the front end show the automotive influence and insure greater safety at night.

Cross seats are used throughout; even the customary short longitudinal seats near the ends of the body are eliminated. Due to the fact that the car is designed for single-end operation, comfortably upholstered seats could be built around the rear vestibule, thus giving a total seating capacity of 57 in a car that is less than 45 ft. long over all. This is accomplished with no sacrifice in comfort, however, for the side post spacing is 30 in. to give wide windows and ample seating room. The seats themselves are of the twin type and are stationary. They are heavily upholstered in Hyaline, aniline dyed and hand buffed. Convenient handholds, mounted on the outside curve of each seat back, provide comfortable supports for standing passengers without detracting from the interior appearance.

One-quarter-inch thick mosaic rubber tile covers the car floor. Haskelite headlining is used not only in the body proper but in the vestibules as well, thus carrying out a finished appearance in the interior to the extreme ends of each vestibule. Center bowl type Safety Car Heating & Lighting Company fixtures provide diffused interior illumination. At the rear vestibule windows heavy draped curtains of blue material lend an air of comfort and luxury to both the interior and exterior appearance of the car. The interior finish is mahogany with nickel-plated fittings. The controller tops, handles and valves at the front end of the car are all nickel-plated to improve the interior appearance.

To facilitate inspection of apparatus under the car, the skirts along the side of the body are hinged in sections to the side sill, so that they may be easily raised. The body top sash, which is applied in a continuous frame on the outside of the side posts, is glazed with individual window sections of clear glass below a narrow rail set down about one-fourth of the distance from the top to the bottom rail, and extending across two window sections, cutting off each alternate upper sash stile to form a long narrow glass opening across each pair of side windows. The lines of this extra upper sash framing are carried across the doors with narrow rails, so as to form continuous glass lines from one end of the car to the other. These top openings are glazed with red glass which is intended to accentuate the streamline appearance of the body. Although the vestibule belt rails are not in line with the belt rail of the body, but are set higher, the side glass lines are carried across the doors, and a broad stripe of paint along the body belt rail is carried across the doors and around the dash. This again gives a streamline effect, and tends to offset the break in structural lines between the body and the end of the vestibule. Around the vestibule belt rail at



The underframe of the Houston car is of conventional design using steel angle side sills and channel cross-sills and bumpers. The underframe at the front end is arranged for inside entrance steps

each end of the car there is built a curved metal hood, inclosing a circuit of concealed incandescent lamps which illuminate the dash at night.

Returning now to the structure and framing of the car, the design follows conventional modern semi-steel construction practice, using wood-covered steel "T" side posts of the type first introduced widely with the Birney safety car. An accompanying cross-section drawing shows the principal body dimensions and the arrangement of posts, sash and roof framing construction. The underframe design is also shown in an accompanying drawing. The body side sills are 3-in. x 2½-in. x ⅜-in. angles. The principal cross-sills are 4-in. 5¼-lb. channels, including the end sills. Bumpers are 3-in. 4-lb. channels with the flanges turned out.



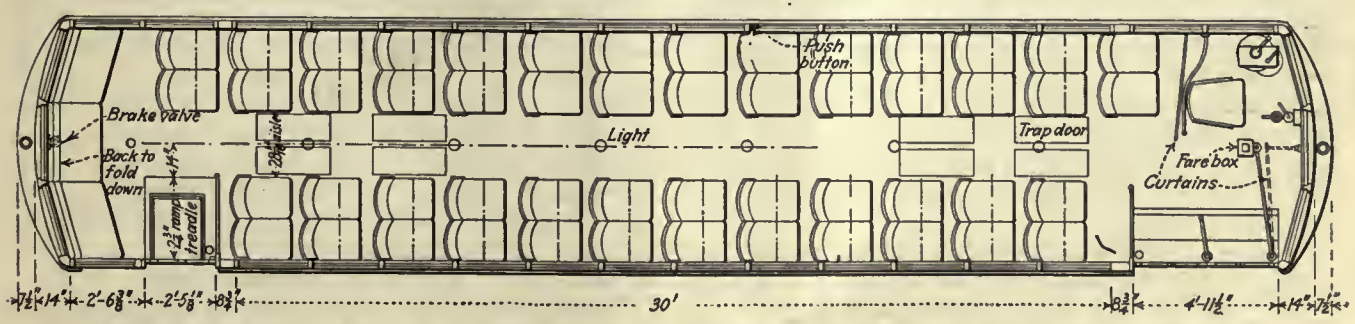
Twin, leather-upholstered seats, a wide aisle, center bowl illumination and draped blue curtains at the rear end present an inviting interior to passengers, as an inducement to leave their automobiles at home

The body floor is 32¼ in. above the rail, with the car mounted on 26-in. rolled-steel wheels. No ramp is used in the floor. At the front end the steps are of the inside type, inclosed by double folding doors. At this point there are three steps from the rail to the body floor. This brings the bottom step very low, to facilitate easy entrance. From rail to body floor the front steps are 12⅜ in., 9$\frac{15}{16}$ in., and 9$\frac{15}{16}$ in. respectively. The over-all front door opening between body and vestibule corner post is 4 ft. 11½ in. These front doors are controlled by the car operator from the Safety Car Devices brake equipment.

At the rear end there is a single folding exit door automatically controlled by a National Pneumatic Company treadle. Here a single folding step is used, making the heights from car floor to rail 13$\frac{1}{16}$ in. and 16$\frac{7}{16}$ in. respectively. Following the practice now generally used for automatic treadle exit door applications on one-man cars, the rear door may be controlled directly by the car operator after the brakes are set, or may be opened from the exterior of the car with a key applied to the street fare collector's valve, which is part of the equipment. Since this car is destined for operation in a Southern city, the automatic exit door provides the solution for the vexing race problem on one-man operated cars. Both white and colored passengers enter at the front end. Whites seat themselves from the front end toward the rear, while blacks seat from the rear toward



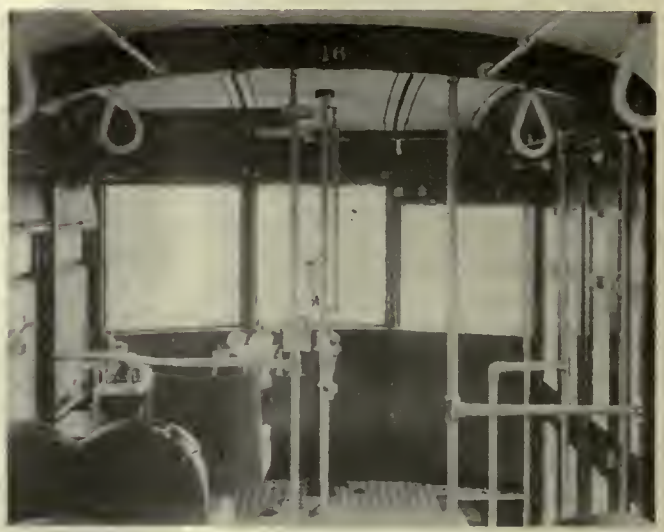
This full side view shows how streamlines have been carried continuously across the doors and gives a good impression of the effect produced by the skirt around the bottom of the body. A strip of narrow red glass is installed in double window sections in the upper part of the upper sash, and is also carried across both front and rear doors



The Houston car is arranged for single-end operation, and is fitted entirely with cross-seats. All seats, including those around the rear end, are luxuriously upholstered in hand-buffed leather in the effort to provide comfort and attractiveness to passengers



Comfortable leather-upholstered seats are carried around the rear end of the body, back of the automatic rear exit door



Note the clean appearance produced in the front vestibule by the use of copper tubing for air piping

the front. Co'ored passengers then leave through the automatic rear exit, while whites leave from the front end of the car. Both in Houston and in many other Southern cities where it has been tried this arrangement is said to have proved entirely satisfactory with the public as a solution of the problem of one-man car operation in combination with race separation.

One of the most interesting and novel features of the equipment on these cars is the method of installing brake and pneumatic control apparatus. Copper tubing is used in place of iron pipe for air lines. This makes possible a number of changes from conventional practice which promise to eliminate many elements of cost, maintenance, time loss and service interruptions that are now experienced. The use of copper tubing simplifies the problem of pneumatic apparatus installation and substantially reduces pipe friction. Since the tubing may be readily bent to fit around points which presented extreme difficulties with former iron pipe and fittings, it can be installed much faster and makes possible a neater piping job. The results that may be accomplished in this direction are clearly shown in the accompanying illustration of the front vestibule of the Houston car, where no piping is visible and where the brake valve is inclosed in a neat housing set up on the dash and entirely free of piping below.

Extreme simplicity of piping installation and reduction of bends and pockets to a minimum are obtained. From the brake valve the copper tubing is carried down back of the vestibule dash, and then with a single bend is carried back along the car floor to the opposite end of the body. It is claimed that by using copper tubing the troubles from scale in iron pipe are entirely eliminated.

All pneumatic apparatus and valves are grouped in a single box mounted under the car floor. This box is approximately 11 in. x 11 in. x 44 in., interior dimensions, and is fastened securely to the car floor by four bolts, one at each corner. In it are contained the various valves of the brake and safety control devices. Two sides of the box are removable for ready access to the inclosed apparatus.

Electrical wiring is contained in flexible conduit, inclosed in a transite-lined wood wiring box. A back-up device consisting of a Westinghouse TC-2 switch and a PV-3 brake valve is provided at the rear end of the car. Variable load brakes, Westinghouse DH-16 compressor, Oskelite stop signal, Economy power meters, Johnson air-operated fare boxes, aluminum stanchions and Hunter destination signs are used on the cars. Other miscellaneous equipment includes National Lock Washer type C curtain fixtures, double-faced Pantasote curtain material, Golden Glow headlights, full Safety Car Devices equipment, Curtain Supply brass sash and fixtures, Feralun and Kass safety treads, Keystone trolley catcher, Ohio Brass trolley base and wheels.

Electric Railway Pension Plans

Some practical suggestions for setting up a sound retirement plan for the employees of a railway company

By E. C. McDonald
Supervisor Metropolitan Life Insurance Company

Mr. McDonald here presents some pithy suggestions on two of the main problems connected with a sound pension plan. He makes no effort to sell this form of better relations with employees, but rather presents a sound solution of the problem.

DURING the last year or two American business has been giving increasing consideration to old age pension plans. Many officials of street railway organizations are confronted frequently with the problem of pensioning their old and faithful employees. They see the pension cost curve rising every year with disturbing regularity, and naturally thoughtful executives wonder where it will end. The necessity for a retirement plan soundly set up with due regard to the liabilities involved has been set forth recently in articles and booklets such as the following: "Industrial Pension Plans," *Annalist;* "Safeguarding Employees' Pensions," New York *Times;* two articles on pensions, *Saturday Evening Post;* two articles on pensions, *Railway Age;* "A Study of Employee Pension Plans" published by the National Metal Trades Association, and "Industrial Pension Plans in U. S." issued by the National Industrial Conference Board.

The increased interest in the whole subject has resulted in the revision of many retirement plans to conform to modern pension practice not only in industry but among

educational institutions and religious bodies. Frequently in considering the subject of pensions some confusion arises because two totally separate problems are combined into one: First, the problem of correct accounting for pension costs, and second, the problem of providing the money to pay pensions.

Basis of Plan

Let us assume that the "Smithville Electric Railway Company" has determined to allow pensions beginning at age 65 in an amount equal to 1 per cent of average salary over the whole period of employment multiplied by years of service. The amount of the pension, of course, may be any predetermined sum, but it should be based either on a fixed amount, as for example $50 per month, or a fixed sum for each year of service, as say $1 per month for each year of service; or a fixed proportion, as say 1 per cent of the average yearly salary. The pension may be based on a proportion of the final five or ten years' salary, but this basis involves unknown quantities because a prediction as to an individual's salary twenty or thirty years hence or what the general wage level will be then is necessarily guessing and does not permit accurate mathematical treatment.

Quite aside from matters of finance, it would seem that as the pension, once determined, is a contingent liability, arising out of continuous service, and usually proportioned to the length of service, this liability should form a proper charge against the current operating cost of the year during which the service was rendered. Therefore, assuming the pension previously outlined of 1 per cent of average salary, if an employee during the year 1927 renders service for which he is paid $2,000 there should be set up against operating expense a charge equal to the present value of an annuity—for every pension is an annuity—of 1 per cent of $2,000, or $20, payable for life from age 65. Now, the value of a life annuity of $20 a year at age 65 is, roughly, $200, and assuming the employee to be 25 years old in 1927 the appropriate charge today would be the present value of $200 forty years hence, which is $41.66. There is no reason that this could not be further discounted by the expectation of the deaths occurring between ages 25 and 65, in which case the railway company should charge against operating cost $26.46.

A succession of such entries during the working life of this employee would build up a credit to offset the annual charges against operating cost, and the obvious place for this credit is an account which might be called "Pension Reserve." It has been assumed in the calculations that the pension reserve account would also be credited each year by interest at 4 per cent as a further charge against operation, and in the event that the smaller of the two figures noted above had been adopted as a basis and death had been taken into account in the original charge, then if an employee should die the amount that had been credited to the pension reserve account would remain as a credit, whereas if the larger of the two amounts had been taken as a basis of original charge then in the event of the death of an employee the amount which had been put up in the account during his previous working life would be withdrawn as an offset to other amounts charged during the year of his death.

When an employee leaves the service prior to pension age, there results a charge against the pension reserve and a credit to operating cost of the amount which had previously been set up for his benefits with its interim accretions.

Looked at as a group, the pension reserve account each year shows the following entries:

1. The total of all the charges to operating account on a reserve for the pensions of employees actively at work during the year.
2. A credit resulting from the charge to operating account of 4 per cent interest on the total credit balance of the reserve account.
3. A charge represented by a credit to operating account for the total reserve heretofore provided for employees leaving the service during the present year.
4. A charge represented by a credit to cash for all amounts paid out as pensions to retired employees for whom reserves had been set up in the past.

In view of the permanence of such an industry as a railroad or a public utility, there seems to be no logical necessity of a segregation of actual money in a fund for the eventual liquidation of drawbacks, not the least of which is the effect on political bodies of the appearance of a huge sum of money which has apparently been taken from customers. The presence of such a fund is also likely to lead and has, in the past, led to undue generosity on the part of boards of directors, or to a reduction of the annual payments into the fund. If, on the other hand, the operating charges be duly made and the fund appears on the "liabilities" side of a corporate balance sheet, there is small likelihood of criticism on the part of regulating bodies, and the directorate is apt to be more careful of adding to this liability than it might be otherwise. Obviously, in dealing with a business of more transitory nature, such as an ordinary industrial company, the fund may be looked upon as an added safeguard to employees.

Plan When Employee Contributions Are Accepted

If employees' contributions are accepted, they could probably be most wisely dealt with by segregation and maintenance either in the hands of an insurance company or a savings bank. It is unlikely that any commercial enterprise is properly equipped to handle most efficiently the weekly deposits of employees. Unless the machinery be extremely well organized, it is costly and liable to cause misunderstandings. In this regard probably the life insurance company is most able to deal with the whole matter to advantage.

For some years it has been the custom of the president of one of our most important railroad systems to give to the public each year in newspaper advertisements and pamphlet form an analysis of each cent of disbursement which the railroad makes out of every hundred dollars of income. Among the items in this analysis we find $5.34 for depreciation of plant and equipment. This item is substantially a constant. In other words, the proportion for depreciation out of every 100 cents of income would probably not vary a great deal from year to year and be approximately 5½ per cent of total disbursements. It was further noted in this analysis that out of every $100 of disbursement 30 cents went for pensions to retired employees. This item for pensions as a proportion of income has been and will be in the future constantly on the increase, so that its per cent relation will vary a great deal, for example from 1927 to 1957. On the one hand, we have an item for depreciation set up every year according to sound accounting methods. On the other hand, we have an item for pensions which does not reflect accurately the depreciation on the human factor. Stockholders subscribe to account-

ing methods which provide for adequate depreciation annually, and yet these same stockholders are not being properly charged for their proportionate share of the depreciation on the services of the employees who produce their dividends.

In other words, in the case of this railroad it is conceivable that the stockholders of, say, 1957 will be charged for pension payments out of all proportion to the depreciation of plant and equipment, and this item might possibly have serious results in determining the dividends of the railroads. The stockholders of 1957 should not be charged for pensions which arise out of service rendered by employees who are making profits for the stockholders of 1927, and yet that is exactly what is being done. It is an odd accounting method which demands that stockholders of 1927 be charged their proper share of the depreciation of plant and equipment and yet shifts on to a future generation of stockholders the burden of providing pension payments arising out of service rendered in 1927.

Fortunately business management is giving increased recognition to the application of sound accounting methods to the human factor as well as to materials, rolling stock, and manufacturing equipment, and eventually, no doubt, the item of sinking fund or reserve payment on account of pensions will be a familiar item to stockholders who examine carefully the annual financial statements of their corporations. Executives of street railways and electric roads will do well to investigate carefully this question of pensions for their employees, and according to the suggestions made in this article if the bookkeeping entries are followed there should be no trouble in preparing a retirement plan on a sound basis. Of course, it is well to call in an adviser who makes a specialty of dealing with situations of this kind, but the whole matter is important and yet simple enough to warrant investigation.

The Readers' Forum

A Substitute for Wood Ties?

PUBLIC SERVICE PRODUCTION COMPANY
NEWARK, N. J., Nov. 2, 1927.

To the Editor:

In the Sept. 1, 1927, issue of the *Iron Age* there appears an article by M.H.C. in which he urges a broad study of steel ties. It is a plea to the engineering organizations of the steel manufacturers to secure for steel "the business that belongs to steel," at the same time inferring that the reason why more steel ties are not being used is because of the fact that competitors of steel, by virtue of greater foresight and business management, have developed a "nearly satisfactory substitute." The author apparently has taken the arbitrary attitude that steps should be taken by the steel industry to force the substitution of steel for wood ties.

If the author is sincere in his statement regarding securing for steel the business that belongs to steel, it is quite likely that railway engineers generally will agree with him, but he certainly must be aware of the efforts during the past 20 or 30 years on the part of the steel industry, and railroad engineers as well, to develop a satisfactory substitute for wood ties. This has not been confined to steel alone but to combinations of steel and concrete, concrete and wood and steel and wood as well, and some of the best brains in the two industries have been working on this problem. M.H.C.'s viewpoint is somewhat warped if he thinks that it is a question of developing a "nearly satisfactory substitute for the steel tie." It has rather been a case of trying to develop a more nearly satisfactory substitute for the wood tie.

The tie committee of the A.E.R.E.A. has studied this question carefully for many years, and the steam railroads have made many experimental installations of different types of substitute ties, the reports on the results of these installations being available to any one who may care to study them. Certainly the electric railway industry has experimented with steel and other forms of substitute ties on a fairly large scale and in many instances the results obtained have been not only unsatisfactory but disastrous financially as well.

The question of steel or other substitutes for the wood tie, and in the use of the term wood tie we of course mean treated timber because no company can afford to use untreated timber for ties, is purely one of economics. Does M.H.C. mean to imply that railway engineers are not alive to the importance and necessity for timber conservation? That this is not so is borne out by the fact that the annual consumption of wood ties for renewals is now approximately 100,000,000, whereas if no treated timber were used for this purpose the requirements would be more than 50 per cent greater than this figure. With about 400,000,000 untreated ties still in service and with treated ties being installed at the rate of about 65,000,000 per year, it will not be very many years before the wood tie situation will be even more favorable than at present. The need for a substitute is rapidly disappearing.

In discussing the above article in the October issue of *Wood Preserving News,* Grant B. Shipley stated the question fairly when he said: "Those who make deductions of cost trends from an examination of raw material values only may be led to a conclusion that railroads, which now pay as much as $1.40 for a wooden tie (which at one time could be bought for 75 cents), must obtain a substitute for such high-priced wood. The fact of the matter is that the 75-cent tie, which had to be replaced several times during the life of a treated tie, cost more per year of service than the $1.40 tie, to which the expense of preservative treatment is added. In spite of increasing raw material costs, the annual cost of wooden ties in service is decreasing through better protection of wood from decay and mechanical wear."

The success which has been met in the preservative treatment of timber has not only increased the life of the previously acceptable timber for ties but has also greatly increased the field of timber available for this purpose, so that if wood preservation is generally adopted, we are now assured of a dependable and economical supply of wood. While M.H.C.'s argument to increase the steel output 2,500,000 tons per year is commendable from the steel manufacturer's point of view, it shows lack of knowledge of all the facts regarding the situation that actually exist, and it will have to be presented in a more convincing way before the steel industry would be justified in making any increase in its present investment in steel-tie-producing machinery. The questions raised by M.H.C. have been answered to the entire satisfaction of the majority of the railway engineers of the country, and the 100 per cent satisfactory substitute for the wood tie has yet to be produced, although the U. S. Patent Office records contain many designs intended to accomplish this result.

HOWARD H. GEORGE.
Chairman Committee on Way and Structures A.E.R.E.A.

Electric Railway Journal Maintenance Data Sheet

ROLLING STOCK—MISCELLANEOUS—16

Sleeve Arrangement Solves Door-Opening Problem

CONTROL of the rear door on one-man cars of the Connecticut Company in cases where there is insufficient room to install door engines has been made possible by a sleeve and rod arrangement operating independently. The sleeve controls the front door, while the inside rod controls the rear door. At its top the sleeve is connected to the door by the usual bell crank and lever. Within this sleeve is a rod connected by a similar bell crank and lever to a long horizontal rod that is in turn connected to the rear door. The inside rod is operated by the same handle as the sleeve controlling the front door. After the car has stopped and the front door has been opened, this handle is lifted off by the motorman and placed in a lower position on the rod to open the rear door. This device has proved extremely useful at heavy loading and unloading points and the convenient arrangement for operating saves time.



Sleeve and rod construction

On one-man cars of the Connecticut Company where there is insufficient room to install door engines, the front door is operated by a sleeve and lever arrangement, while the rear door is operated by a rod inside the sleeve.

Electric Railway Journal Maintenance Data Sheet

ROLLING STOCK—STANDARDS—11

Permissible Variations and Clearances for Armature Bearings

IT IS advisable to fit armature bearings with the minimum permissible clearance to the shaft to reduce vibration and pounding. Babbitt lined bearings with ample oil grooves should have initial clearances before they are pressed into housings with the proper tonnage as follows:

Nominal Bore	Plus Allowance Inches for Bore Before Pressing Into Housing
2 to 3 in.	0.006 to 0.008
3 to 4 in.	0.008 to 0.010
4 to 5 in.	0.012 to 0.014
5 to 6 in.	0.016 to 0.018
6 to 7 in.	0.018 to 0.020

Permissible Variation on Armature Shaft at Motor Bearing Seat—With nominal diameters up to 7 in., the permissible variations of armature shafts at the bearing seat should not exceed + 0.0 in. to — 0.002 in.

Press Fits of Bearings in Housings—The following permissible variations should be observed to secure a press fit of approximately 3 to 7 tons:

1. The nominal bore of the bearing seat in the housing should not vary more than 0.001 in.

2. The permissible variations for the nominal outside diameter of the bearing is + 0.002 to + 0.004 in.

3. A bearing should not be returned to service if the pressure required to press it into the housing is less than 1 ton.

Allowable Wear Between Shaft and Bearing Bore—The maximum total radial wear in service for armature bearings of motors less than 50 hp. should not exceed $\frac{3}{64}$ in. total between the shaft and the bearing bore. For motors larger than 50 hp. $\frac{1}{16}$ in. may be allowed.

Armature shafts which are worn $\frac{1}{64}$ in. at the bearing seat should be remachined to the nearest standard undersize.

Armature End Play—Overhauled motors should not be returned to service with less than $\frac{3}{32}$ in. or more than $\frac{3}{8}$ in. total armature end play.

The maximum total armature end play in service for motors less than 50 hp. should not exceed $\frac{1}{16}$ in. For motors larger than 50 hp. $\frac{1}{4}$ in. may be allowed.

The armature end play should be taken up by the use of $\frac{1}{16}$-in. washers between the bearing flange and the housing. Where this wear is more on one end than the other, proper adjustment should be made.

Armature bearings should be pressed into housings with a hydraulic press. A sledge should never be used.

Electric Railway Journal Maintenance Data Sheet

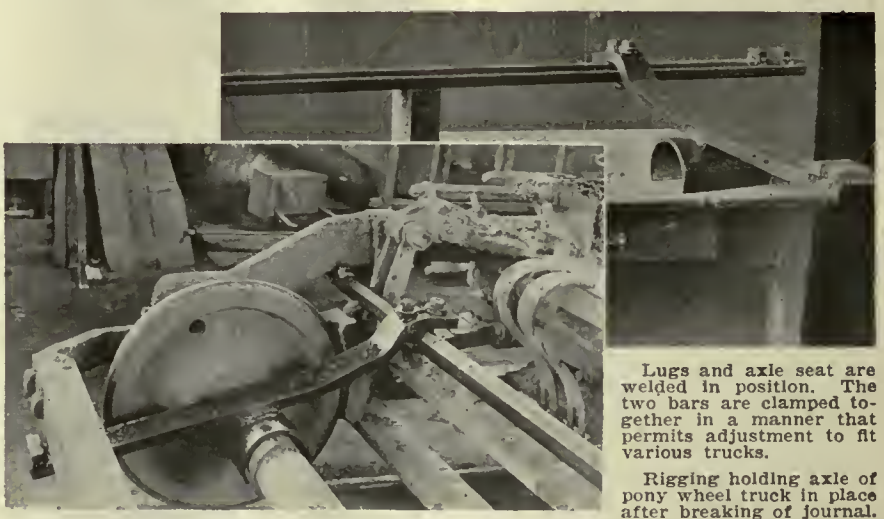
ROLLING STOCK—MISCELLANEOUS—17

Bringing in Cars with Broken Pony Journals

By A. F. Rexroth
Master Mechanic Harrisburg Railways, Harrisburg, Pa.

DIFFICULTY experienced by the Harrisburg Railways, Harrisburg, Pa., in bringing in cars with broken pony journals has resulted in the development of a rigging which holds the axle firmly in place during the trip back to the shop.

The improvements made in the rigging now used consist of a cross bar extending from beneath one side member of the truck frame to the similar member on the opposite side and of a longitudinal bar between this cross bar and the end of the truck frame. To the underside of the longitudinal bar is welded a curved bearing which fits the axle. The cross bar is of high carbon steel of octagon section and 1¾-in. diameter. The flat bar used for bearing support is 1-in. x 4-in. steel. Cross and longitudinal bars are clamped together in such a way that adjustment can be made to fit the various types of pony wheel trucks. This rigging is put in place after lifting one corner of the truck frame with an ordinary jack. The process of installation usually takes about ten minutes.



Lugs and axle seat are welded in position. The two bars are clamped together in a manner that permits adjustment to fit various trucks.

Rigging holding axle of pony wheel truck in place after breaking of journal.

Electric Railway Journal Maintenance Data Sheet

ROLLING STOCK—STANDARDS—12

Permissible Variation and Clearances for Axle Bearings

USUAL practice is to mount axle bearings with a greater initial clearance than is allowable for armature bearings, as axle bearings as a rule are not lined with babbitt and are not fitted with oil grooves. It is desirable, however, to make the initial clearance as small as possible in order to reduce the spreading of gear centers and to minimize vibration and noise. Allowable initial clearances of from 0.015 in. to 0.017 in. have given good results in service.

Tolerances on Axle at Motor Bearing — The tolerances recommended for all sizes of railway motor axles at the motor bearing seat are + 0.002 in. to — 0.002 in.

Clamp Fits of Bearings in Motor Frame—To secure a correct clamping fit, the bearing seat in the motor frame and the axle cap should be machined with a 0.0172-in. liner at the split.

Bearings should not be returned to service if the axle caps will not clamp the bearing tightly.

The permissible variation of the nominal outside diameter of the bearing is + 0 in. to + 0.003 in.

Allowable Wear Between Axle and Bearing Bore—The maximum total wear for the axle and bearing bore in service should not exceed $\frac{1}{32}$ in. for motors up to 50 hp. For motors larger than 50 hp. $\frac{1}{8}$ in. may be allowed.

Axles which are worn at the bearing seat $\frac{3}{32}$ in. or more on the diameter should be remachined to nearest standard size.

Motor End Play — Overhauled equipment should not be returned to service if the motor has less than $\frac{3}{32}$ or more than $\frac{1}{8}$ in. end play on the axle.

Axle bearings should not be returned to service where the flange wear is $\frac{1}{8}$ in. or more.

The maximum total motor end play for motors up to 50 hp. in size should not exceed $\frac{1}{4}$ in. For motors larger than 50 hp. $\frac{3}{8}$ in. may be allowed. Adjustable axle collars may be used to correct excessive end play.

Truck with Shelves for Moving Material About Shop

By Jesse M. Zimmerman
Renewal Parts Engineer Westinghouse Electric & Manufacturing Company

INSUFFICIENT care is given in the handling of parts such as field coils, bearings, and so forth, as they are moved from the storeroom to the shop for assembling. They are usually carried into the shop and laid on the floor as close as possible to the place where they are to be used. Many times they are in the way during previous operations before it comes time to use them. They must either be moved or subjected to unnecessary bumps and abuse.

The accompanying illustration shows a convenient type of truck with shelves which will be found particularly suitable for moving small repair parts about the shop and to the job. The truck illustrated was



Convenient type of ball-bearing truck for moving small repair parts about shop

designed by the equipment and method department at the Homewood Renewal Parts Works of the Westinghouse Electric & Manufacturing Company. It is equipped with ball-bearing castors, which turn in a ball-bearing pivot.

The material to be used in any assembling operation can be placed on one of these trucks and moved about the job or shop with ease, placing it in the most convenient place for the workman and thereby saving both time and material.

Self-Closing Commutator Cover

MOTORS in operation on the lines of the New York & Queens County Railway, New York City, originally were equipped with malleable iron commutator covers held in position by cam levers. When the shop men neglected to fasten the



Losing of motor covers overcome by self-closing feature

covers properly after inspection or repair work they would drop off in service and were lost or destroyed. This necessitated a continual replacement with a resultant increase in maintenance expense.

A motor cover designed to overcome this objectionable feature was fastened permanently to the motor shell and was provided with a self-closing inspection door, as shown in the accompanying illustration. This new cover was made from a solid piece of $\frac{3}{8}$-in. plate of approximately the same over-all dimensions as the old cover. A rectangular hole 5x15 in. cut out of the center of this plate provides for access to the commutator and brush-holders for inspection and repair work. The motor shell was drilled and tapped and this solid plate was bolted permanently by $\frac{3}{4}$-in. bolts. A sheet iron cover of $\frac{1}{8}$-in. plate was made up to cover the rectangular hole in the $\frac{3}{8}$-in. plate. This cover was rod hinged to the $\frac{3}{8}$-in. plate and fitted with a spring which closes it and keeps it closed at all times when in service.

New Equipment Available

Combined Fuse Puller and Screw Driver

FUSE puller and screwdriver are combined in a device just placed on the market by the Trico Fuse Manufacturing Company, Milwaukee, Wis. This little tool is made of horn fiber and is 5 in. long. One end has gripping jaws for handling small cartridge fuses $\frac{1}{4}$ in. to $\frac{1}{2}$ in. in diameter. The other end has a screwdriver for use on small screws such as are used in lighting sockets, plugs, etc. The insulation prevents shorts as the screwdriver blade is the only metal and this extends but $\frac{3}{8}$ in. beyond the fiber handle.

High-Frame Guided-Ram Hammer

GREATER working space than is found in the usual types of air or steam hammers is provided in a type just brought out by the Chambersburg Engineering Company, Chambersburg, Pa. The increased clearance between the die and the under side of the frame increases the capacity. Particular attention has been given to the cylinder design. Deep stuffing boxes make better joints and the self-draining cylinder dispenses with long delays necessary



High-frame hammer

to pump the condensate. The throttle valve is of the rotary self-seating type and the operating valve is ground into a removable cage. Both give great steam or air efficiency.

Correct vertical alignment is secured by machining parts in jigs. The guide-adjusting wedges are positioned independent of the guides and have a full bearing to avoid the rocking tendency. Tie bars reinforce the frame at the guides. The ram has a longer bearing in the guides and guide ways than are generally employed.

The safety cylinder cover provides a cushion of live steam or air at the top of the cylinder not subject to the pumping of the hammer. This limits the stroke to protect the cylinder and eliminates the hazard and expense of broken cylinder covers in the event of rod breakage or loosening.

American Association News

Engineering Association Committee Appointments

SIX more committees of the Engineering Association have had their personnel completed, according to announcement from association headquarters. They are given below. In addition it is announced that H. L. Rogers has resigned from rolling stock special committee No. 9 and that his place has been filled by the appointment of E. R. Rath, Cincinnati, Ohio.

POWER DIVISION—SPECIAL COMMITTEE No. 1—MANUAL REVIEW

J. WALTER ALLEN, electrical engineer Boston Elevated Railway, Boston, Mass., chairman.
L. W. BIRCH, Mansfield, Ohio.
H. W. CODDING, Newark, N. J.
JOHN LEISENRING, Springfield, Ill.
G. F. MCCLELLAN, New York, N. Y.
H. W. MCROBBIE, Connellsville, Pa.
W. J. QUINN, New York, N. Y.
A. SCHLESINGER, Indianapolis, Ind.
R. G. WINANS, New York, N. Y.

POWER DIVISION—SPECIAL COMMITTEE No. 13—PROPER TROLLEY VOLTAGE FOR CONGESTED CITY DISTRICTS

M. W. COOKE, superintendent power and incline Pittsburgh Railways, Pittsburgh, Pa., chairman.
A. J. KLATTE, Chicago, Ill.
H. S. MURPHY, Philadelphia, Pa.

ROLLING STOCK DIVISION — SPECIAL COMMITTEE No. 2—MOTOR COACHES

V. W. BERRY, assistant general manager of railways Virginia Electric & Power Company, Richmond, Va., chairman.
S. B. COOPER, East Pittsburgh, Pa.
H. L. DEBBINK, Milwaukee, Wis.
WILLIAM DOWNEY, Buffalo, N. Y.
H. C. EDDY, Newark, N. J.
F. A. KLOCK, Highwood, Ill.
L. H. PALMER, New York, N. Y.
A. J. SCAIFE, Cleveland, Ohio.
C. W. STOCKS, New York, N. Y.
G. W. WILSON, Schenectady, N. Y.

ROLLING STOCK DIVISION — SPECIAL COMMITTEE No. 10 — WELDING OF WHEEL FLANGES

J. S. MCWHIRTER, superintendent of equipment and buildings Third Avenue Railway, New York, N. Y., chairman.
A. D. BISSELL, East Pittsburgh, Pa.
R. S. BULL, Pittsburgh, Pa.
J. A. DUFFY, Fairmont, W. Va.
C. F. GAILOR, New York, N. Y.
M. O'BRIEN, St. Louis, Mo.
C. A. BURLESON, Schenectady, N. Y.

WAY AND STRUCTURES DIVISION—SPECIAL COMMITTEE No. 13 — JOINT RAILWAY AND BUS TERMINALS

E. D. ECKROAD, chief engineer ways and structures Northern Ohio Power & Light Company, Akron, Ohio, chairman.
J. I. CATHERMAN, Springfield, Ill.
R. J. CUSTER, Columbus, Ind.
T. H. DAVID, Indianapolis, Ind.
D. J. GRAHAM, Youngstown, Ohio.
F. A. KLOCK, Highwood, Ill.

WAY AND STRUCTURES DIVISION—SPECIAL COMMITTEE No. 16—FOUNDATIONS FOR SPECIAL TRACKWORK

H. A. ABELL, engineer way and structures New York State Railways, Rochester, N. Y., chairman.
R. B. BROKAW, Peoria, Ill.
P. A. MEYER, Connellsville, Pa.
J. C. NEWMAN, Norfolk, Va.
J. H. SUNDMAKER, Cincinnati, Ohio.
D. H. WALKER, Indianapolis, Ind.

Safety Committee Announced by Claims Association

PRESIDENT J. S. KUBU of the Claims Association has announced the full personnel of the committee on safety. This committee is the successor of the former committee on traffic and safety, the membership of which was made up jointly from the Claims and Transportation and Traffic Associations. The list of members follows:

H. K. BENNETT, safety manager United Electric Railways, Providence, R. I., chairman.
A. D. BROWN, Syracuse, N. Y.
H. E. CADY, Utica, N. Y.
J. R. COMPTON, Birmingham, Ala.
R. H. FERGUSON, Chicago, Ill.
J. W. GILTNER, Akron, Ohio.
G. H. INGLES, Richmond, Va.
A. G. JACK, Wilmington, Del.
P. W. KLABUNDE, Milwaukee, Wis.
T. C. NEILSON, East St. Louis, Ill.
J. M. ORTS, Newark, N. J.
J. J. REYNOLDS, Boston, Mass.

COMING MEETINGS OF *Electric Railway and Allied Associations*

Dec. 7—Power Transmission Association, annual meeting, Hotel Commodore, New York, N. Y.

Jan. 16-17—Midwest Electric Railway Association, Hot Springs, Ark.

Jan. 18-19—Kentucky Association of Public Utilities, annual meeting Brown Hotel, Louisville, Ky.

Jan. 25-27—Electric Railway Association of Equipment Men, Southern Properties, Roosevelt Hotel, New Orleans, La.

Jan. 26-27—Central Electric Railway Association, Cincinnati, Ohio.

Jan. 31—New York Electric Railway Association, annual meeting, Hotel Commodore, New York, N. Y.

Engineering Subjects Announced

GENERAL SECRETARY J. W. WELSH has within the past few days sent to all members of committees of the Engineering Association the subject assignments for 1928. Each committeeman has been furnished with a complete list of all subjects for the various special committees in the division with which he is identified, so that he will be in close touch with all the work that is being done along similar lines with that in which he himself is involved.

Motion Picture and Sterepticon Division Organized

PLANS have been completed for the establishment of a motion and stereopticon picture division of the advertising section of the American Electric Railway Association, and distribution of material is about to begin.

Two films, one entitled "Wheels" and dealing with traffic congestion, its causes and methods of relief, and "Carrying On," a picture dealing with the readiness of electric railways to furnish service 24 hours a day, rain or shine, now are ready for distribution. These reels are about 1,000 ft. each in length, and require from twelve to fifteen minutes to run. They are captioned in such a manner that they may be used in any community. The pictures originally were taken in Chicago, and, through an arrangement with the Chicago Surface Lines, thence were recaptioned and nationalized. Although Chicago scenes are shown, the pictures are very general in character, and will be followed with interest wherever displayed.

Other films are in the course of preparation and announcements regarding their completion will be forthcoming soon. At present, the association plan is to confine all pictures to 1,000 ft., or one reel.

Standard size, non-inflammable film will be used on all pictures. They will be shipped in heavy cases, specially made for this work. Films may be either bought outright or rented. Companies will be charged for the use of films only during the actual time they are in the possession of companies. A minimum charge of $5 will be made for the use of any film. For this amount any member company may use a film three days or less. A charge of $1 per day will be made for each additional day that each film is in the possession of any company, regardless of whether it is shown or not. No charge is made for the time required to send or return a film.

If two copies of the same film are desired at one time in order to make showings in more than one place, the rate will be just double that charged for a single film. The association is completing arrangements with a Chicago still film and camera manufacturer to supply members with a stereopticon film service. The exact cost of this service has not yet been determined.

News of the Industry

Service Readjustments in Providence

Management plans a number of important changes in the interest of economy —To discontinue freight

PLANS being made for bettering transportation service in Providence, R. I., as rendered by the United Electric Railways are gradually being unfolded to the public by the management there. These plans are wide in their scope, applying as they do to nearly all branches of the service. The company is at present seeking permission from the Public Utilities Commission to abandon practically all of its trolley freight service. The company has also proposed to substitute one-man cars for the two-man conveyances now in use on the Atwells Avenue line. Extensive substitution of one-man cars for the double-end vehicles on most of the lines also is planned. President Luke C. Bradley has denied that one-man cars will be used all over the system, but said the aim is to "put one-man service in Providence where it will furnish service as good as or better than is given at present."

One-Man Cars an Economy

Mr. Bradley said that it is possible to give more frequent service at the same expense with one-man cars than with the two-man cars. On such routes as the Pawtucket line, however, one-man service would not be so satisfactory as the present arrangement. He pointed out that the Eastern Massachusetts Street Railway, the Worcester system, the Springfield lines and the Newark, N. J., service are now "practically 100 per cent one-man services."

In 1923, the U.E.R. carried 138,578,000 passengers. In 1926 it carried only 103,319,000 passengers. The company carried 1,651,000 fewer passengers during the first eight months of this year than during the corresponding months of last year. The monthly loss in gross revenue this year has averaged between $18,000 and $29,000. Notwithstanding the decrease in patronage and gross revenue, the company has operated virtually the same number of miles, both by bus and street car. The service mileage in 1923 was 16,783,000, whereas in 1926 it was 16,661,000, a decrease in three years of only 122,000 miles.

Despite this, net income has improved, due entirely, according to Mr. Bradley, to economies in operation. Figures furnished the Public Utilities Commission recently showed the railway to have obtained 50.22 per cent more net income in the ten months preceding Oct. 31 this year than in the corresponding months of 1926. For October of this year alone the net income was $43,532, compared with $17,418 for October of last year.

Mr. Bradley asserted the maintenance of railway service is as much a matter of public concern and co-operation as it is of management. Part of the decrease in railway patronage he attributed to the great increase in automobile ownership.

Mr. Bradley specified one "useless and unnecessary" service as the competition between bus and railway lines both operated over a single route by the United Electric Railways. In some such cases, he asserted, neither the trolley nor the bus routes pay at present, although elimination of one or the other would put the remaining service on its feet.

William B. Spencer, assistant to the president of the company, recently told the Pawtuxet Valley Board of Trade that the company will discontinue its railway service between Providence and Washington after the first of the year, and will extend the present bus service, now operated as far as Arctic, to Washington, in order to accommodate patrons now served by the railway.

One of the matters the company now has before the Public Utilities Commission is the abandonment of its freight service. At a recent hearing on this subject Herbert Shaftoe for the company said he had urged the abandonment of the freight service after he had discovered the yearly losses through an analysis made at the request of President A. E. Potter, and after other officers of the company had advocated abandonment. Mr. Shaftoe said that early in 1924 he was requested by President Potter to make a study of revenues and expenses of the freight department, and that at that time another company official declared that "there was nothing in the trolley freight business" and ultimately it would have to be abandoned.

More Reports in Chicago

City Council hears report of Faherty's foreign subway inspections. Discusses plans for early start on Chicago's subways. Surface lines franchises to be extended once more

ENTHUSIASM is on the wane again in Chicago over prospects for an early beginning on the long-delayed subway system. Anticipated difficulties due to a recent controversy between the Board of Local Improvements and the City Council as to which body will have authority to initiate subway construction seem to have been averted and, from that quarter at least, harmonious action is now assured. The present law gives this power to the Board of Local Improvements, with the Council authorized only to approve or disapprove the board's program.

Appearing before the local transportation committee of the City Council on Nov. 22, following his return from an inspection trip of European subway systems, Michael J. Faherty, president of the Board of Local Improvements, announced that he is ready to begin digging as soon as the City Council smoothes out the legal and financial difficulties. Mr. Faherty was met as he arrived in New York last week by a subcommittee of the local transportation committee bearing the engineering plans recently drafted by Major R. F. Kelker, Jr., city engineer, for a comprehensive system of tubes.

In presenting his formal report of the inspection trip Mr. Faherty issued this warning to the Aldermen:

> I have been hearing aldermen and legislators wrangle over subways for eight years. I know that unless the traction people agree among themselves and unless the City Council and the State Legislature agree, all of you will be talking for years and nothing will be done. We can't build subways until provision is made for both surface and elevated lines. The city cannot buy the elevated lines or build a loop subway for them alone, because some taxpayer will rush into court and claim that the city's traction fund was raised from the nickels of the surface car riders. All parties must get together.
>
> When the City Council frames it so that we can dig legally and when they tell us how to get the money, the Board of Local Improvements is ready to build subways finer than those in any city in the world.
>
> We have nothing to fear from engineering difficulties. The Chicago soil is better suited to subway building than that of London or Paris, but in Berlin, with its sand and gravel foundation, they have it easy. In London they have to dig down 40 ft. or buy the property overhead. That is one problem we shall not have to face.

One of the first steps in the program, Mr. Faherty pointed out, will be the construction of a working model of the proposed system in order to save possible engineering mistakes. The necessity for this, he explained, was strongly impressed upon him when visiting the London subways.

According to the city Corporation Counsel's office, three possible courses are open to the City Council in overcoming legal and financial obstacles. First, the Legislature might be asked to pass the new transit bill which specifically authorizes subway construction by special assessment. This method, although it would be safest legally, would be slow because it would be necessary to postpone construction until the complicated questions of transit consolidation, home rule and indeterminate permits are settled by

legislative action. Second, the Council might proceed with the work under the local improvement act as it now applies, taking the stand that a subway is simply a "lower level street" and therefore no different legally from a new surface street, pavement or sewer system built as a local improvement and paid for by bond issues and assessments against the property owners benefited. In such a case, the Board of Local Improvements could start spreading assessments at once, but the necessary court action on assessment proceedings, it was pointed out, might cause considerable delay. As a point in favor of this system, several Aldermen recalled that between 75 and 95 per cent of all property owners on State and Wells Streets last year agreed to voluntary assessment.

The third method suggested is the appropriation of the present $55,000,000 city traction fund as a special improvement. This plan is not being considered very seriously, however, because by using the traction fund the city would have to forego the use of assessment money unless property owners would contribute a share voluntarily.

Enabling Bills Advanced

As a result of Mr. Faherty's pledge of co-operation to the Aldermen and the popular desire to speed up the legislation necessary to effect a traction settlement and to start building subways, four of the five transit enabling bills —those dealing with a local transit commission, consolidation of transit facilities, indeterminate permits and the amending of the present act which limits franchises to twenty years—were approved by the full committee on local transportation at its meeting on Nov. 29. The new bills would give the city the added authority to solve the traction problem. They were immediately submitted to executives of the companies for examination, with the request that the latter meet with the Aldermen on Dec. 9 to straighten out any differences. No action was taken on the fifth bill authorizing subway construction.

For the third time in the past ten months the franchises of the Chicago Surface Lines have been extended again, this time for a 30-day period, effective Dec. 1, pending settlement of the entire transportation problem. Renewal of the present extension under which the street car lines have been operating since Aug. 1 was approved on Nov. 23 by the City Council. Although the understanding with the companies had been that nothing could be done to clear up the franchise situation until the city had completed its draft of the new traction bills, Mayor Thompson has declared that this will be the last extension that will be given to the companies. "The companies have got to come in and play ball with us," he said, "or they are going to find themselves in a bad hole about Jan. 1."

In answer to the Mayor's ultimatum, Leonard A. Busby, president of the Chicago City Railway, said that he is prepared to come before the transportation committee at a moment's notice to discuss the city's legislative measures and negotiate for a settlement. Mr. Busby agrees with the Mayor as to the importance of immediate action, but added that it was highly improbable a settlement could be reached in 30 days.

Better Copy Contest by Utilities Advertising Association

The Public Utilities Advertising Association has started a Better Copy Contest to encourage the continued development of public utility advertising and to award recognition to outstanding advertisements, according to Donald M. Mackie, president. It will embrace the entire field of public utility operation, but will be operated in three distinct divisions, covering separately the fields of electricity, gas and transportation.

The national utility associations, including the National Electric Light Association and the American Gas Association, embracing in their membership practically all public utility organizations, have indicated their interest in the plan and have offered their co-operation in assisting toward the success of the contest. To this end arrangements are being made between these national associations and the Public Utilities Advertising Association whereby the national bodies will make the awards for the winning advertisements in their respective fields. The plan contemplates the awarding of a certificate of merit for the best advertisement together with honorary award for second and third places in each of the three fields of utility activity embraced in the contest—electricity, gas, and electric and bus transportation. The contest will be conducted by the better copy committee of the Public Utilities Advertising Association, Irving M. Tuteur chairman, and the judging for awards will be made by a committee of judges representing the national associations.

The contest is open to all public utility operating companies and will cover advertisements released during 1927 and the early part of 1928 up to a date to be announced by the committee. All subjects dealing with public utility operation and service are eligible in their respective divisions and will include advertisements released in newspapers, periodicals, by direct mail or other media.

The winning advertisements, together with a selection of 500 advertisements chosen from among those submitted, will be published in the 1928 edition of "500 Representative Public Utility Advertisements" to be issued by the Public Utilities Advertising Association in the coming midyear.

The Public Utilities Advertising Association includes in its membership the advertising and publicity managers of practically all important utilities in this country and a number in Canada, together with representatives of publications, advertising agencies and organizations in the public utility field.

Baltimore Considers Fare Opposition Side

Opposition to a plea by the United Railways & Electric Company, Baltimore, to charge a 10-cent fare instead of the present 7½-cent rate is now being heard by the Maryland Public Service Commission. The company's side of the case has been concluded. In an effort to conclude the case as soon as possible both sides have agreed to submit briefs on the day the final arguments begin. The commission may be able to hand down its decision before the new year.

Cincinnati Company Seeks to Accelerate City's Program

The Cincinnati Street Railway, Cincinnati, Ohio, is seeking permission to borrow $750,000 for track repair purposes in order to co-operate with the city in its accelerated street improvement program. Under the new franchise the company was given four years in which to make improvements to the total of $1,750,000. Practically one-fourth of this amount has been spent in 1927. The improvements for 1926 were made out of earnings from the previous year.

Under the franchise the company would spend approximately $400,000 for improvements in 1928, but as the city wishes to improve more streets than this sum will replace tracks, it has become necessary for the company to have more money.

The entire question resolves itself into whether or not the company will be permitted to anticipate its earning for the next two years. Under the franchise it is not permitted to do this, and if Council grants permission to borrow the money it will be necessary to amend the franchise ordinance.

Walter Draper, president of the company, said that after the improvements are made there naturally will be less annual outlay for track and car maintenance, and that he also looked for an increase in patronage.

Parlor Car Service in Scioto Valley

On its parlor car limited service, the Scioto Valley Railway & Power Company, Columbus, Ohio, is operating luxurious cars patterned after the Western steam observation car equipment, except that the rear platform is glass inclosed. A small excess fare is charged, the largest amount being 25 cents. In this service the public is given individual chairs, deeply upholstered. It appears that the public is appreciating this equipment as it is liberally patronizing the cars. In its passenger and freight time table, the company recommends that the "Mount Logan," the "Lord Dunmore" and the "Mount Pleasant," parlor chair cars, be used by the public for their speed, luxury and economy.

1928 Model Proclaimed a Winner

Brooklynites turn out in big numbers to try out new car. Attractive, comfortable and safe. Management gratified at public's receptivity

A RUSH HOUR which begins at 10:30 and ends at 4:30 is something to reckon with in railway travel, but when the operators and riders keep on smiling, that is something to write home about. Some riders wouldn't even leave the car. One outspoken burly fellow who apparently had found more than bliss in married life exclaimed: "I wouldn't go home nights if I could stay in these seats." To which an old and wrinkled mother responded enthusiastically: "Sure and it's heaven."

These and similar spontaneous and frank comments were provoked by the 1928 model electric car proposed for use on Brooklyn's surface lines and exhibited at Borough Hall, Brooklyn, on Nov. 29 and 30. Here, under sultry skies, the "Pink Lady" received more than 10,000 ardent and curious subjects. There were business men bound for Manhattan, women shoppers, students fortified with slickers and pipes and park bench squatters who left their beloved places in the shadow of the Brooklyn Borough Hall long enough to sample more comfortable seats.

A jolly conductor, rotund in figure and orotund in voice, urged all to walk right through. At his solicitation the curious and interested sank in the leather-upholstered seats, took in the unobstructed view afforded by the vestibule windows and admired the mahogany panels at each end of the car which concealed the operating apparatus. Once the scientific scrutiny was interrupted by a raucous voice, "Oh, for the life of a motorman," when the discerning passenger observed the operator's seat of leather at each end of the car.



A scene from "Public Relations," staged in open-air theater near Borough Hall

The racy looking body of the car, in old rose (clover club) with buff decorations, the interior lighting effects, motors and brake equipment competed for interest with the treadle door. As the passengers stepped upon a plate at the exit the treadle door opened automatically, but only, as one cicerone explained, when the brakes on the car had been fully applied. Then these passengers stood outside to watch the next person alight. He in turn joined the vast army of awed spectators.

Comment Elicited Without Coaxing

Company's representatives walked in and out among the people, showing pictures of the cars and announcing the purpose of the new equipment, which is to be operated for a short period on the DeKalb Avenue line and then will be transferred for a further period of experimental operation to the Seventh Avenue line. Although the management wanted the people to know these details it was more concerned with their reaction, and so sought comments and suggestions on cards distributed as the people boarded the car. Spontaneous response, such as "Henry Ford's new model has nothing on this" and "What will all this decoration cost us," were appreciated by the representatives of the company present, but the written opinions were considered more thoughtful and hence more indicative. By and large, these opinions indorsed the 1928 model for greater comfort, less noise, more attractive appearance and more efficient and economic operation. A few regarded such lavish facilities impossible on a 5-cent fare. Many extolled the comfort of the seats. A little adverse criticism was leveled at the low exit and the seating arrangement, considered by some to make clearances too narrow. One meliorist went so far as to draw a diagram of his idea.

A complete account of this model car will be published in the Electric Railway Journal, issue of Dec. 10.



On free admittance crowds stormed entrance to see model car

Seattle After the Parked Taxi

In a controversy before the public safety committee of the City Council of Seattle, Wash., over an ordinance which would abolish all downtown parking stands for for-rent vehicles, particularly taxicab parking, Councilman W. T. Campbell appeared on behalf of the municipal railway, declaring that it would be greatly benefited if the taxicab and for-hire vehicles were required to park their cars elsewhere than on city streets. Action on the measure was deferred for one week.

Oneida Receiving Reasonable Service

Because the New York State Railways was rendering a reasonably frequent service to those within walking distance of its lines the Public Service Commission denied a certificate to the Clark Motor Service for a line over certain streets in the city of Oneida now operating an interurban service under a resolution by the Common Council on Aug. 10 last. The commission held that public convenience and necessity do not require the operation of the bus lines. Operating losses by the New York State Railways in Oneida have increased from $7,273 in 1924 to $17,337 in 1926.

Finishing Touches Being Put to Milwaukee Program

The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., is now completing its 1927 program of city and suburban railway track extension and reconstruction.

A double-track extension has been built along Teutonia Avenue from Nash Street to Atkinson Avenue. On Eighth Avenue tracks have been extended from Oklahoma Avenue to Ohio Avenue. On Atkinson Avenue between 27th and 32d Streets, the company has laid new double tracks, foundation and pavement in place of the former single track.

Major track reconstruction jobs included Third Street, Center to Burleigh; Juneau Avenue, Third to Seventh; Kinnickinnic Avenue, California to Linebarger; National Avenue, Clinton to First; Wells Street, viaduct to 52d; Broadway and Wisconsin Avenue, new intersection. The tracks and track zones now built are calculated to endure for more than 25 years.

Ten new one-man safety cars have been purchased for city and suburban service. Delivery is expected on Dec. 30. These cars will be used to meet an expected increase in travel this winter.

Operation of one-man, electrically heated safety cars was begun on the Eighth-Muskego line recently, and application has been made to the Railroad Commission of Wisconsin for authority to improve service on the State Street line in similar manner.

Labor Injunction Hearing Put Over Until Dec. 21

Further adjournment until Dec. 21 was granted by Supreme Court Justice Wasservogel for argument on the motion of Interborough Rapid Transit Company, New York, for an injunction to restrain the representatives of organized labor from soliciting membership among the company's employees. This is the second adjournment. The request for the postponement was made by Nathan D. Perlman, representing organized labor. It was not opposed by attorneys for the company.

$12,000,000 Canal-Bed Subway Opened in Rochester

Rochester's municipally owned $12,000,000 subway in the bed of the abandoned Erie Canal was opened to passenger service on Dec. 1. The New York State Railways is to operate the line for a three-year trial period under the service-at-cost contract by which the company operates the railway and bus lines in Rochester. The Rochester & Syracuse Railroad also will divert its interurban cars from the city streets to the subway, which connects at Brighton with the tracks of the interurban.

Work was begun on the subway five years ago. Rochester is considered the smallest city in the United States with a subway of any length, the line being 7 miles long and cutting through the heart of the city.

The five steam railroads entering the city also will use the new line, giving added switching facilities to industries along the route. Separate contracts for the different roads using the service have been negotiated.

The test period during which the New York State Railways will operate the subway railroad was set at three years because the service-at-cost contract governing operation of the surface lines expires at that time.

Pittsburgh Interurbans Install New Rates

Ride-selling fares include zone, ticket, group mileage, coupon book and children's privileges. All schemes on trial basis. Response more than satisfactory to company

DURING the latter half of 1927 the associated Pittsburgh, Mars & Butler (Mars route) and Pittsburgh, Harmony, Butler & New Castle Railways (Harmony route) in Pennsylvania initiated several changes in fares to encourage various classes of patronage. Each was put on for a trial period, but extensions have been made in every case because of the satisfying riding response from the public. The ultimate financial value of the experimental rates is still difficult to estimate because they were installed during a period of industrial depression, when revenue was declining in any case.

A $1 fare was established as of July 1, 1927, as the maximum from any one point on the system to any other, exclusive of the Pittsburgh entrance over which the Pittsburgh Railways charges its usual one-zone rates of 10 cents cash, 8⅓ cents token or $1.50 weekly pass. This $1 rate represents a reduction over rides of fifteen to 26 zones costing $1.05 to $1.82 at the ticket rate of 7 cents per zone of 2 miles per zone. A corresponding ticket, good for children five to twelve years of age, is sold for 50 cents.

Any-Day Round-Trip Rate

As of Aug. 31, 1927, a special round-trip rate of $1.50 from any point to any other point on the company routes (exclusive of Pittsburgh local fare) was made for Wednesdays, that day being the lowest of the week. There is no corresponding rate for children. Both types of tickets are sold by conductors as well as ticket agents.

The management started a different style of any-day round-trip rate, intended for semi-regular riders, as of Aug. 2, 1927. Owing to the decline in employment locally, it was desirable to do something for patrons who would buy monthly commutation if employed six days a week but who are now on a part-time basis. These round-trip tickets are made up in strips of five pairs per book, and a different color is used for "going" and "returning." These round-trip or "group mileage" tickets are good for 30 days. They are sold only through the agents. The latter write the origin and destination on the cover to avoid the need for printing a special ticket for each combination.

The group mileage tickets are sold for blocks of two to six zones, which takes care of the greater part of the riding, but a patron can buy two types of books, such as a three-zone and a six-zone, if he happens to be a nine-zone round-tripper. The prices of these books range in 50-cent steps from $1 to $3 inclusive for the two-zone to six-zone combinations. Their popularity suggests that they are meeting very well the condition raised by part-time employment. These tickets cost about 14 per cent less than mileage.

Still another, and probably the greatest, innovation is what has been cleverly termed a "local community service" tariff, effective Oct. 20, 1927. During 1926 the tariff had been raised from 7 cents to 10 cents per zone cash, with ticket rates at 7 cents per zone. This was roughly equivalent to 5 cents and 3½ cents per mile respectively, but 10 cents was required of an adult and 7 cents cash of a child five to twelve years for a ride which might be only 1 mile between stops.

Although the usual headway on each route is an hour, many of the residents along the route had adjusted themselves so well to the schedule that there was a notable amount of short-haul travel. This was impaired by the increase to 10 cents cash minimum.

The problem before Harry Etheridge, vice-president and general manager, was to recover this traffic and yet retain a high average fare per mile. This he achieved by originating a strip ticket made up of 1-cent coupons in books of 25 cents, 50 cents and $1. Five such coupons pay for a ride to the first fare point, 7 cents to the second fare point, 11 cents to the third fare point and 14 cents to the fourth fare point, which constitutes the maximum distance for a fare especially devised to encourage shopping and visiting under the name "local community service."

This 1-cent coupon rate has proved very popular because of its low starting rate and general convenience. Yet the actual rate per mile works out at 5 cents to the first fare point, 3.5 cents to the second fare point, 3.66 cents to the third fare point and 3.5 cents to the fourth fare point. At times the demand for the 25-cent and 50-cent books has been like the run on a bank.

These 1-cent coupon books are sold both by conductors and agents. The user is at liberty to pay for others

with this transportation. The same privilege holds true of the group mileage round-trip tickets, except that the latter have a 30-day time limit.

The management also made certain reductions in its non-transferable 60-trip adult and 44-trip children (five to eighteen years) calendar month commutation as of Sept. 1, 1927. A 40-ride, six-month family ticket averaging about 3 cents a mile is another element in this company's endeavor to have a fair rate for each class of travel.

No Controversy in Houston

Since Park Place became a part of the city of Houston, Tex., the Houston Electric Company, under Stone & Webster executive management, has been furnishing interurban service at a cash fare of 12 cents, or 10 cents when tickets were purchased, with half fares for students and children. Prior to its inception into the city it was served by the interurban line running between Galveston and Houston. After its inception it became necessary for the Houston Electric Company to render service to the community or else make arrangements with the Galveston-Houston Electric Railway, which is under the same management, to furnish this service. The people of Park Place expressed a desire to have the interurban service continued. The fare had been 18 cents.

The company wishes to have it made plain that there was no "fight" over this issue and further states that the possibility of express service to West End and Houston Heights, mentioned in the Electric Railway Journal, issue of Nov. 5, 1927, page 878, was merely talked about among the officials, but that nothing definite has been done or determined.

Elsewhere in this issue is an article entitled "Houston Electric Company Makes Good Its Promises." The article points out that the growing attitude of co-operation between the public and its transportation company is beginning to show the full measure of its possibilities both for the development of the city and the improvement of local service.

$10,458,034 Subway Loop Awards Let in New York

Two contracts totaling $10,458,034 for the construction of the Nassau-Broad Street subway loop of the Brooklyn-Manhattan Transit Corporation system have been awarded by the Board of Transportation. One section of the new link, that from the Municipal Building at Park Row to Liberty and Nassau Streets, will be built by the Marcus Contracting Company, which was the successful bidder at a price of $4,772,885 for the section. The other section, from Liberty Street to Broad and South Streets, will be constructed by Moranti & Raymond, who bid $5,735,149.

The construction of the Nassau Street subway has been delayed for ten years, among other things, by legal as well as political controversy. For alleged failure to construct the link in accordance with the contract the city is being sued for $20,000,000 by the B.-M. T. The city and the company have disagreed since the first part of the Hylan administration as to the necessity for the completion of the loop, the city being inclined to drop it. The city once offered to build the loop on condition that the B.-M. T. would discontinue its suit. The offer was refused.

Completion of the loop will make it possible to operate trains over the Williamsburg and Manhattan Bridges to the Municipal Building and thence back to Brooklyn via Nassau and Broad Streets and the Montague Street tunnel to De Kalb Avenue.

Former New York Commissioner Criticises New Unification Plan

George McAneny, former Transit Commissioner, criticised as impractical on Nov. 29 the plans at present being considered to relieve the transit situation in New York City. He spoke at a luncheon of the Real Estate Board in Manhattan. Mr. McAneny began by saying that in his opinion, some changes of public policy should be made, and possibly a different method of approach on the part of the civic bodies taken if real progress is to be made. He said:

What the city needs is a unification of existing lines upon a practicable working basis, with the broadest of transfer privileges; the linking, so far as possible, of both old and new lines with this object in view; the rehabilitation of the existing lines as the nearest measure of relief, and the expansion of their facilities to the farthest possible degree.

He went on to say that the city, instead of setting out in a business-like manner to do these things, is wrangling about dollars and cents. Actual unification, either physical or corporate, is going to prove a slow process, according to Mr. McAneny, who said:

In 1921 it could have been done. The companies were then in the doldrums. That was the day for bargains. But the plan of unification then proposed encountered the stone wall of Hylan stupidity. But for that it probably would have been carried through.

The situation today is different. The rapid transit lines are earning real money. They will not readily be dislodged from their present position, even if that were now considered desirable.

Going on to his own ideas for improvement, Mr. McAneny said:

What we need first of all is a remapping of that part of the proposed system now under construction in so far as better mapping is still possible; immediate application of the salvaged funds to such projects as the lengthening of local platforms upon the existing Interborough lines; the betterment of rolling stock and other equipment, and finally a really sane study of the whole matter of basic financing. "Plans" along these lines will be better worth discussing. I fear that the present proposals offer nothing but more delay, and the waste of present facilities.

Violators of Indianapolis Strike Injunction Must Serve Sentence

A fifteen months fight by John M. Parker and Robert B. Armstrong to evade a 90-day jail sentence imposed in federal court in Indianapolis, Ind., for violating an injunction during the strike of the employees of the Indianapolis Street Railway in July, 1926, was lost recently when Judge Robert C. Baltzell denied a petition to quash the charges and ordered the men to begin serving their sentences. They were taken to the Marion County jail a short time later by United States deputy marshals with Edgar Day, a striker, sentenced to 30 days on the same charge.

Parker and Armstrong, organizers of the local branch of the union, carried their case to the Circuit Court of Appeals. There the sentence was upheld. They charged the Indianapolis Street Railway had employed Harry Boggs, president of the local, to act as informant of the union activities and had purchased dynamite for Boggs to use as a means of creating public sentiment against the union. Boggs served a 60-day sentence for violating the injunction.

Judge Baltzell discredited the charges against the company, pointing out that the evidence had been reviewed before and that no indication of fraud had been discovered. Albert Ward, United States District Attorney, said the Department of Justice had gone into the charge that dynamite was purchased and that no evidence confirming this had been uncovered.

Parker and Armstrong charged that the railway obtained its anti-strike injunction by fraud and that the alleged threats of violence against employees on which the injunction was issued actually were made by railway agents.

James P. Tretton, superintendent of the railway, declared it was absurd to think the company would try to get people to ride its cars and then buy dynamite to blow them off the cars.

Honest Car Riders in Evansville

People who ride street cars in Evansville, Ind., are honest. This can be proved by Howard S. Butler, circulation manager of the Evansville *Courier*, a daily morning newspaper. Two or three years ago Mr. Butler installed "honor" boxes on the city street cars and on cars entering the city of Evansville. One is at liberty to take a copy of the paper and is expected to drop the money in a slot.

No one is at hand there to see that the money is deposited. It is strictly a matter of one's honor, Mr. Butler said. It is his conviction that his newspaper lost very little money on papers left in these boxes. The railways whose passenger cars carry these slot news boxes are the Evansville & Princeton, Evansville & Booneville, Evansville & Newburg and the Evansville & Ohio Valley Railway Companies.

Fare Increase Sought on Utica Interurban

A petition asking authority to increase interurban fares between Utica and Little Falls, N. Y., was filed by the New York State Railways with the Public Service Commission on Nov. 22. It alleged that the present fares are insufficient to yield a reasonable compensation for the service rendered and are unjust and unreasonable. The company claims a gross loss on the interurban line of $11,658 for the nine months ended Sept. 30, 1927.

The schedule provides for increases in one way and 50-trip ticket books both between the various stops and villages from Utica East. The special round-trip ticket rate of 6 cents in effect between the four Herkimer county villages is increased to 10 cents. The special round-trip ticket rate of 20 cents between Frankford and Forest Park is discontinued. In addition to other changes the schedule provides that tickets in strips of ten be sold for 75 cents. These tickets will be good for any 10-cent fare between stops 9 and 36.

"Enough Nickels a Day Will Help the Railway"

"Enough nickels a day will help the railway" is the slogan of Mayor Bertha K. Landes and D. W. Henderson, superintendent of the Seattle Municipal Railways, Seattle, Wash., for the little red cars which have been placed on the downtown run with a 5-cent fare for the short haul. The cars make a loop in the downtown business district. They were put into service to cater especially to the short-haul business. As indicated previously in the ELECTRIC RAILWAY JOURNAL, the first day's receipts were $61.31, the second $78.43, while the third were $95.01. When the fifth day showed receipts of more than $100, Mayor Landes became highly interested and went to the Jefferson Street carhouse to inspect the cars before they went out and to confer with Mr. Henderson.

If the 5-cent fare in the downtown loop proves successful it may be extended to other short lines. During the first week 10,306 passengers, including those riding on transfers or tokens, were carried by the loop cars.

Final Briefs in Schenectady Case

In a brief it is presenting to that body the Schenectady Railway contends the New York State Public Service Commission has jurisdiction over the matter of the fares that the railway may charge. In the brief the company also asks that the motion be denied which was made by M. P. Poersch, corporation counsel of Schenectady, seeking dismissal of the railway's petition for increased fares.

At a hearing in September, Mr. Poersch asked that the railway's petition be dismissed on the grounds that the Public Service Commission had no jurisdiction to specify fares on the lines within the city of Schenectady, since the rates were fixed by contract between the city and the company.

The railway points out that the early franchise agreement, containing a 5-cent fare provision, was superseded by others in 1911, 1919 and 1920. The 1919 ordinance authorized the commission to pass upon the company's application for an increase in fare from 5 to 6 cents; the ordinance of 1920 provided for a 7-cent fare.

At the hearing in September the commission reserved decision, pending submission of briefs.

Let the Motorman Be Your Guide

An accident for which a trolley car is responsible is a rare exception. Collisions between automobiles and the injury or death of pedestrians run down by them are so common as though it would cease to be news.

Observe the trolley motorman. He runs no risk. He does not wait for the situation of danger to arise. Before the situation is dangerous he has shut off the power.

How often do we see a motorist adopt a precautionary measure until the accident is almost too imminent to avoid.

If the motorman has an accident he must answer for it to a stern boss. The motorist may have to furnish a few explanations to a traffic judge, but the latter, a hundred to one, is a motorist himself and, at all events, such mishaps are an old story to him.

The motorist, found guilty of recklessness, seldom is penalized beyond a fine which he can well afford to pay. The motorman, convicted of gross carelessness, loses his job.

The motorman's motto is, "Safety First."

The motto of many a motorist is, "Take a Chance."—*Norristown Herald.*

Remission of Taxes in Poughkeepsie Discussed

Mayor Frank B. Lovelace said recently that if the Poughkeepsie City & Wappingers Falls Railway, Poughkeepsie, N. Y., requests the city to forego the interest and penalties on its debt, a special act of the Legislature will be required to permit the city to accept less than the full amount of the assessment bill. For this reason it would be impossible to clear up the entire matter until after the first of the year. The Mayor said it is not the purpose of his administration to attempt to settle all the matters in connection with the railway in the next month, but that he and his associates are attempting to formulate a plan and map out a course which the next administration may follow.

Without the penalties added the sum the railway owes the city is $190,000. The matter is being considered for settlement on that basis.

E. M. Dickens with Chicago Surface Lines 53 Years

For the first working day in more than 53 years Edgar M. Dickens of Chicago was not on hand on Nov. 10, when the starter down at the Chicago Surface Lines carhouse called his run. He, who is believed to be the oldest street car motorman in the United States in point of service, retired that day with the congratulations of Guy A. Richardson, vice-president of the railway. The 78-year-old railway man plans to live in California.

With a service record as old as the industry, Mr. Dickens acquired his first railway experience as a driver of horse cars in Chicago in 1873. He was assigned to operate one of the first cable cars in that city when they were put into service on the State Street line in 1881 and in 1907 was motorman of the first street car to be propelled by electric power in Chicago. Moving pictures of the aged veteran driving one of the original horse cars were taken by the *Pathe News* at the time of his retirement and shown in many local theaters.

Franchise Matter Up Again in Omaha on Jan. 15

Action on the matter of a new franchise for the Omaha & Council Bluffs Street Railway, Omaha, Neb., has been put over by the Council until Jan. 15. Meantime it is believed it will be possible to negotiate another franchise draft that will be satisfactory all around. The protective committee representing the bondholders is so thoroughly convinced of this that it is recommending that all bondholders deposit their securities so that the three years extension of the $9,000,000 issue due on Jan. 1 may be arranged.

The October report shows the company earned within $392 of its bond and other interests. Transportation revenue decreased $14,090, from $247,016 to $232,925; operating revenues from $251,615 to $237,847; operating expenses from $177,025 to $165,167, and operating income from $46,235 to $36,202. Taxes increased $6,800 for October, 1927, over October, 1926.

Minnesota Line Advances Rates

The St. Paul Southern Electric Railway, operating between St. Paul and Hastings, Minn., in the hands of a federal receiver, on Nov. 21 advanced rates and decreased its schedule. Application to the Minnesota Railroad and Warehouse Commission was not required under the circumstances. The one-way fare is 60 cents instead of 50, the round trip $1 instead of 95 cents, with ten rides for $4.50 still in force. To cut expenses the last car leaving Hastings at 9:40 p.m. is to be eliminated three days of the week and the owl car from St. Paul at 11:15 p.m. is to cease operation.

Seattle's Woman Mayor Wants Attractive Cars for Railway

While waiting to hear from the St. Louis Car Company on the deal for the purchase of 80 new cars for the Seattle Municipal Railway, members of the City Council of Seattle, Wash., are trying to find a local market for $500,000 of bonds, so that the proposed steel trestle may be built across the West Dawamish Waterway. Both the trestle construction and the delivery of new cars have been blocked pending the recent federal court litigation involving the railway. But now that a ruling has been made favoring the railway, efforts are being renewed to bring the much-needed improvements.

Mayor Bertha K. Landes has appealed to the Puget Sound Power & Light Company and J. C. Von Herberg, as a duty toward Seattle, and as public-spirited citizens, not to press further the federal court suits they brought against the Municipal Railway to determine a priority lien on its revenues. The Mayor urges both parties to announce immediately an intention not to appeal from the recent ruling favorable to the railway of Judge Dietrich of the U. S. Circuit Court of Appeals.

Neither Mr. Von Herberg nor counsel for the power company has said whether an appeal will be made, but it is considered likely that the power company will continue its case, since the company wants a court ruling which would establish a priority for the holders of the purchase bonds. If such a ruling were obtained, Councilmen declare it would virtually block further railway bond issues. All improvements to the system would increase the value of the purchase bondholders' collateral, but would not indemnify holders of bonds issued to make the improvements.

Mayor Landes approves of the suggestion of Councilman W. T. Campbell to buy street cars of greater comfort and convenience than those planned originally. She believes that the cars should contain individual seats and possibly smoking compartments. Mr. Campbell estimates the additional cost for these features would be between $1,000 and $2,000 a car.

Freight Transfer Facilities Established by North Shore

Increased facilities for receiving and handling freight have been established by the Chicago, North Shore & Milwaukee Railroad with the completion of arrangements to receive shipments at four stations of the Illinois Tunnel Company, the narrow-gage electric subway system which transports freight beneath Chicago's downtown streets. The four stations are all located in or near the Loop district and are in addition to the eight regular receiving depots of the North Shore Line, located all over Chicago.

Arrangements have also been effected whereby the North Shore Line will handle through overnight shipments to many points in Wisconsin reached by the Milwaukee Electric Railway & Light Company, the Milwaukee Northern Railroad and the Wisconsin Power & Light Company's rail lines.

The increased service is made possible through the company's new flat car-motor trailer equipment, which eliminates many handling and transfer operations, according to E. F. Weber, general freight agent of the North Shore Line.

Receivers Keep Oklahoma Patrons Informed

An interesting advertisement which follows the policy of the receivers of the Oklahoma Railway, Oklahoma City, Okla., to keep patrons informed on financial affairs of the company appeared in the Nov. 9 issue of the *Oklahoma Railwayan,* house organ of the company.

A portion of the advertisement reads:

The money you drop in the fare box is divided in many ways. Figures of the last few months show that 39 per cent of it will go to pay the salary and wages of 680 persons who are on the company payroll. Another 10 per cent goes to buy new material, while taxes and interest on indebtedness will take another 22 per cent.

Compromise Plan in Decatur Fails to Win Approval

By a vote of 482 to 291 the citizens of Decatur, Ga., have rejected the compromise plan of the Georgia Power Company and will refuse to exchange the 5-cent fare to Atlanta for a 7-cent fare and the establishment of bus lines to the Emory University and Ponce de Leon car lines. The compromise offered by the company consisted of the establishment of two bus lines, one from Decatur to the Emory University car line and the other from Decatur to the Ponce de Leon car line, with a 10-cent fare, including the privilege of transfer to the car line. It also included the payment of a $14,000 street paving assessment against the company and the promise of assistance in other paving work in return for the abrogration of the present 5-cent fare.

The Georgia Power Company has made several efforts to have the 5-cent fare agreement with Decatur abrogated without success. The Legislature has repeatedly refused to pass the necessary laws and the Public Service Commission has several times declared the affair to be out of its jurisdiction since the agreement was made before the commission was created. Once the case was carried to the United States Supreme Court, the city of Decatur winning every decision.

Officials of the company state that at a 5-cent fare the interurban line is a losing proposition and they wish to place it on a 7-cent basis along with every other line operated by the company. However, the company cannot increase the fare under the present conditions and cannot suspend service on the line.

Compulsory Savings by Utility Company Employees

A utility company in Kansas has recently taken the position that every employee in order to remain in the company's service must save at least 10 per cent of his pay. The employee is asked to fill out a card each month showing how his savings are made. Savings acceptable to the company include installments on stock purchases, savings bank deposits, building and loan payments, life insurance premiums, payments on homes, and other similarly worthy methods of saving. The rule is enforced on the theory that the man who is careful about his own affairs will be careful of the company's interests also. Payments on automobiles for pleasure are not acceptable savings.

One-Man Car Issue Acute in Des Moines

Institution of one-man car service by the receivers of the Des Moines City Railway, Des Moines, Iowa, is thought to be only a matter of weeks since C. L. Herring, receiver of the company, has said that the order of Federal District Judge Martin J. Wade undoubtedly gives the receivers power to terminate the 25-year contract between the union and the company which makes it obligatory to use a motorman and a conductor on each car.

Weight is lent to Mr. Herring's declaration by the fact that his statement was made after he recently had a session with Judge Wade. Neither Mr. Herring nor the co-receiver, F. C. Chambers, would indicate the course of action likely to be taken when asked what their plans were for an economy program.

The auditor's monthly report for October, the last full monthly period prior to the receivership, showed that the railway is going deeper and deeper in debt under its present operating schedule and fares. The debit to the stabilizing fund for October was $20,191. This makes the aggregate deficit to Nov. 1 approximately $170,000. As the receivers have promised to continue the present service and fare rate, the general supposition is that they will turn to one-man car operation to bring operating expenses within the income. November has been unusually warm, and the indications are that it will also show a deficit.

Articles in Des Moines newspapers show that more than 400 cities of the United States have either all one-man or partial one-man car service.

New Crosstown Line in Dallas

The San Jacinto and the Trinity Heights lines of the Dallas Railway & Terminal Company, Dallas, Tex., are to be merged into a new crosstown line. George I. Plummer, traffic superintendent, has issued orders on the routes.

Recent Bus Developments

Commission Approves Bus Purchase at Instance of Court

In its final order approving the petition of the Indianapolis Street Railway to purchase the People's Motor Coach Company for $500,000 the Indiana Public Service Commission expresses regret that it was not represented legally when the case came up in the Marion Circuit Court and indicates that Judge Harry A. Chamberlin was mistaken in his statement that the commission based its decisions in the case on "history" rather than on fact.

The commission's action was in compliance with the recent order of the court. The ruling followed the denial of the petition by the commission some months ago for the merger, a denial also by the commission of a petition for rehearing, appeal to the Circuit Court where a preliminary hearing was held, and a second announcement by the commission to the court reaffirming its original stand. After tracing the history of the case, the order quotes Judge Chamberlin's opinion as follows:

The Public Service Commission presented no facts to controvert those submitted by the petitioner and gave nothing to assist the court in sustaining its findings.

In response the commission says:

In this connection, the commission wishes to state that the Attorney-General is by law the commission's legal counsel; that the Attorney-General advised the commission that it cannot be a party in court procedure to an appeal taken from the commission's final order under the provisions of the acts of 1927 and, not being a party, cannot present facts upon its own initiative; that the commission was anxious to be present and participate in the proceedings on said appeal. The commission felt that it did not have the right to suggest to the court its willingness to take part in said proceedings and feels now that it followed properly the advice of its legal counsel.

The last order requires the motor coach company to maintain its corporate identity. The railway is directed to pay out of the operating revenues of the Peoples Motor Coach Company outstanding obligations amounting to approximately $92,000 at the time of the original public hearing before the commission. This is in accord with a contract made on March 25, 1927, between the railway and holders of common capital stock of the bus company.

Mitten Tour Terminal Moves

The Philadelphia, Pa., terminal of Mitten Tours, intercity bus operating subsidiary of the Philadelphia Rapid Transit Company, was moved on Nov. 30 from 237 South Broad Street to the ground floor of the Mitten Building, at the northwest corner of Broad and Locust Streets. With this change in location all Mitten Tours intercity buses will load and unload passengers on the north side of Locust Street, just west of Broad Street. The new terminal in the Mitten Building will provide a spacious waiting room with every provision for the comfort and convenience of passengers. Ample quarters are also provided for ticket and information desks.

All Mitten Tours buses operate from the garage located at 26th Street and Girard Avenue. Buses are dispatched from this point to the central bus terminal a few moments before scheduled leaving times. Incoming buses unload their passengers at the passenger terminal and immediately proceed to the 26th Street garage.

Buses to Replace Cars in Helena

The Helena Electric Railway, Helena, Mont., will cease to function as operator of a railway system at midnight, Dec. 31, and the Service Transit Company will begin a schedule of regular bus service over approximately the same streets now traversed by the cars. The bus firm is owned by R. P. Crago and L. F. Schroeder. This change is in accordance with the plan for the future operation of the utilities in Helena reviewed in the ELECTRIC RAILWAY JOURNAL for Nov. 26, page 1006.

Bus to Replace Discontinued Railway

The Connecticut Company has been authorized by the Public Utilities Commission to take up 1 mile of track in Stratford, Conn. Previously the commission had ordered the company to relay the track on another part of the highway to expedite the construction of a new road surface. The railway could not see its way clear to spend the $17,000 required for this work and petitioned for the right to discontinue service. The patrons in this section will be transported by bus.

Union Traction Receiver Would Enjoin Bus Company

Arthur W. Brady, receiver for the Union Traction Company of Indiana, has obtained a restraining order from the Circuit Court at Anderson, Ind., enjoining the Fort Wayne Motor Coach Company from operating a bus line along the route used by the Union Traction buses between Marion and Indianapolis, via Alexandria, Anderson, Fortville and McCordsville. The Indiana Public Service Commission, which had just issued a certificate of convenience and necessity for the establishment of the new bus line, was named defendant also. The railway considers the competition most unfair.

Would Operate Stage Line in San Diego

The San Diego Electric Railway has applied to the California Railroad Commission for a certificate of public convenience and necessity to operate Lloyd's El Cajon Stage Line, between the city of San Diego and the town of El Cajon. In a previous decision the applicant was authorized to acquire the property of this line.

Monticello Bus Line in Operation

Three new buses were placed in operation on Nov. 10 for the residents of the Monticello loop section of Clarksburg, W. Va., by the Monongahela West Penn Public Service Company.

The buses carry 23 passengers. Two of the vehicles are to operate regularly, with three during rush hours on a fifteen-minute service. These buses take the place of the car line formerly serving this section.

Decision Protects Indianapolis Company

Holding that the Indianapolis Street Railway should not be subjected to the competition of intercity bus carriers in Indianapolis streets over which the company operates lines, the Indiana Public Service Commission adopted an order Nov. 26 denying the request of the Hoosier Transportation Company for authority to receive and discharge passengers in West Washington Street. The order held that the service proposed by the bus company probably would be a convenience to the territory served, but that it was not a necessity. The bus company operates between Indianapolis and Terre Haute.

Details of Youngstown's Depreciation of Its Buses

Money has been transferred to the bus depreciation fund of the Youngstown Municipal Railway, Youngstown, Ohio, sufficient to pay for eleven buses which are still fit for service. These buses were delivered in February, March and April, 1923. They were purchased for $76,367, all of which has been transferred in monthly installments to the depreciation fund, which draws 7 per cent interest. As it is not necessary to replace the buses Railway Commissioner Engle says the $1,272 which has been transferred monthly to depreciate them now will be retained as earnings.

According to Mr. Engle there will have been transferred to the fund by Jan. 1 money sufficient to depreciate seven more buses, worth $47,551, and by Feb. 18 to depreciate six more, worth $45,554. Allowances of $792 and $759 have been made monthly to take care of these buses, which after those dates will remain in the earnings. From 4½ to 5 years is allowed for replacement of a bus, Mr. Engle said.

Financial and Corporate

Tax Issue Raised

Cities said to be concerned about ruling in San Francisco municipal railway case, reviewed by local paper

A NEW tax issue appears to have been raised. According to a dispatch to the San Francisco *Chronicle* from Washington the United States Government will not attempt to collect a tax of 13½ per cent upon the net earnings of the municipally owned public utilities of San Francisco, except its bus lines. So far as the bus lines are concerned, the government has demanded and will receive a tax payment of $900 from the city on the earnings of the municipal bus lines from July 1, 1920, to June 30, 1924. Payment will be made under protest by the city.

In response to announcement of the local Internal Revenue Department at San Francisco that it will demand a 13½ per cent tax on profits of the San Francisco Municipal Railway, the dispatch from Washington announced:

The Treasury Department has turned down cold the suggestion from Collector of Internal Revenue McLaughlin of San Francisco that the income from San Francisco's municipally-owned utilities be taxed under the income-tax law.

The *Chronicle* quoted a high official of the bureau as saying:

We will have to go over the dead body and the decisions of John Marshall, who held more than 100 years ago, while handing down his decision as Chief Justice of the United States, upon which our government today is largely founded, that the federal government has no authority to tax the states nor the municipalities and that they, likewise, have no authority to tax the federal government.

That the Internal Revenue Department in Washington has been mystified with queries relative to what the government intends to do relative to municipally-owned properties taxation, further was vouchsafed in the dispatch from Washington, which continued:

Chiefs of the Bureau of Internal Revenue have been very much mystified by a flood of queries in the last few days on what the bureau proposed to do regarding the assessment of a tax against the income from the San Francisco Municipal Railway, the Hetch Hetchy power plant and the Embarcadero bus line.

No such policy has been established for the country at large and yet the bureau was informed that Collector McLaughlin was taking steps to assess such a tax. The bureau, fearing that its San Francisco agents were about to commit a grievous error that would react adversely, immediately wired Collector McLaughlin for information.

The collector's answer was received today and merely said they were still considering the matter and were waiting for authority from the bureau in Washington before proceeding. It was intimated very strongly today that this authority will not be forthcoming.

That the matter of taxing San Francisco's municipally-owned utilities originally was brought up by McLaughlin, the dispatch from Washington said further:

The matter was brought up originally by McLaughlin, who inquired of the bureau whether he should tax the income from these utilities. Never having heard of any such suggestion before and, desiring to ascertain further information in the matter, the bureau asked McLaughlin to send copies of the contract between the city of San Francisco and the Pacific Gas & Electric Company for the sale of power for examination by its lawyers. Other documents were asked for, none of which have yet been received.

Mr. McLaughlin said that in connection with the proposed collection of a tax of 13½ per cent upon the municipally owned public utilities of San Francisco the collection of taxes on the bus lines is a matter of court record, and that the taxes shortly will be forthcoming.

The Washington dispatch, announcing the government does not intend to attempt to collect taxes on municipally-owned properties in San Francisco, in conclusion, said:

The bureau chiefs made it plain that the idea (tax collection on municipally-owned properties in San Francisco) did not originate anywhere in the Treasury Department in Washington, but came out of San Francisco and that they were merely giving the matter routine consideration and had no idea of ever giving it their approval.

Mr. McLaughlin had announced that the government's move in this city to collect taxes on municipally-owned utilities was the preliminary act in a nation-wide campaign to collect income taxes on such properties, the total of which would run into staggering sums.

Sale of Detroit United Unit Avoided

Public sale of the Detroit-Monroe-Toledo unit of the Detroit United Railway, Detroit, Mich., has been averted by bondholders who paid the state $100,000 on account of back taxes. The line was to be sold at auction on Nov. 25. Back taxes total $739,000. Bondholders are expected to petition the state administrative board to withdraw the penalty charges, leaving a net tax due of about $500,000.

Plea for North Shore Equipment Trusts Heard

A recent application of the Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., for an order authorizing the issuance of $804,000 of new equipment trust certificates was heard by the Illinois Commerce Commission in Chicago on Nov. 22.

$5,000,000 Illinois Power & Light Issue Offered

An additional issue of $5,000,000 first and refunding mortgage bonds, series C, 5 per cent, 30 years, of the Illinois Power & Light Corporation, Chicago, Ill., is being offered by Harris, Forbes & Company, Halsey, Stuart & Company, Inc., Marshall Field, Glore, Ward & Company, E. H. Rollins & Sons, and Spencer Trask & Company. They are priced at 98, yielding more than 5.13 per cent. The Illinois Power & Light Corporation owns and operates electric power and light, gas, heat and city railway properties in a large number of municipalities in Illinois.

Utility Operator Takes Option on 300-Mile Steam Road

The Texarkana *Gazette* says that the Louisiana & Arkansas Railroad has been sold to H. C. Couch and associates. The price was reported to be $10,000,000, of which $500,000 has been placed in escrow with Charles S. McGain, president of the Park National Bank, New York, the balance to be paid Jan. 15.

Mr. Couch is president of the Arkansas Power & Light Company, Little Rock, Ark., controlled by the Electric Power & Light Corporation. He has long been prominent in the utility field. There has been no intimation about the ultimate disposition of the railroad soon to be acquired, but it has been indicated that plans ahead point to the ultimate electrification of at least part of this 302-mile road.

Three Merger Plans in Washington

B. McK. Bachman, chief accountant of the Public Utilities Commission of the District of Columbia, has presented a plan for consolidating the street railways of the District. According to Major W. E. R. Covell, who as acting Engineer Commissioner is also serving as a member of the commission. the Bachman plan is expected to be of material assistance to the commission in working out a merger plan to be presented to Congress. It is the only one of the three thus far projected that is before the commission in complete detail. The scheme drafted by Harley P. Wilson has been before the commission officially since Oct. 31, but it is not in complete form, and the author does not desire the commission to discuss it at public hearings until his final plan is submitted.

The third merger plan, worked out by the firm of Charles Hansel, consulting engineers and utility specialists, for the public utilities committee of the Federation of Citizens' Associations, is now being printed and put in form for publication. The Hansel plan is contained in a document of 125 closely typewritten pages and more than 100 maps, charts and plats. It is based on a comprehensive transportation survey made

by the firm's engineers, and is said to be patterned after the so-called Mitten plan, now applied to the city systems under the direction of Mitten Management, Inc.

Business Slump Hurts Youngstown Receipts

Traction Commissioner Engle has reported for the third consecutive month an actual loss in the operation of the lines of the Youngstown Municipal Railway Company, Youngstown, Ohio. The company, in September, failed by $11,009 to pay expenses, the report shows. The actual losses in July and August were $2,786 and $1,990. The company should have earned $26,738 on a 7 per cent basis in September.

Revenues slumped in September to $114,355, a $20,000 drop from the $164,958 revenue in September, 1926. While the earnings dropped, the mileage decreased about 5,000 miles, from 468,345 in September, 1926, to 463,546 in 1927.

In other months this year, with falling incomes, the mileage has been increased over the same months in 1926. Earnings for September fell off $6,000 from those in August and $9,000 from the July revenue. Mr. Engle attributes the lowered earnings to the general slump in business.

Seeks Right to Purchase Short California Line

Permission to buy control of the Petaluma & Santa Rosa Railroad, Petaluma, California, was sought from the Interstate Commerce Commission on Nov. 30 by the Southern Pacific and Santa Fe Railroads, acting jointly. The Petaluma company owns 40 miles of line and operates steamboats into San Francisco. The purchasing corporations have a contract to pay $90 a share for two-thirds of the outstanding stock of the Petaluma company.

San Antonio Preferred on Special Terms

An opportunity to purchase the preferred stock of the San Antonio Public Service Company, San Antonio, Tex., has been offered to the employees up until Dec. 15. The stock will sell at $100 a share, with payments to be made $5 a share when stock is purchased and $5 a share each month thereafter until the stock is entirely paid for. Not more than ten shares will be sold to any one person.

In the *Broadcaster*, the official publication of the company, W. B. Tuttle, president, said that he would recommend all employees who can do so to make arrangements to purchase at least one share. The company has been offering its preferred stock for local sales for a number of years, and more than $4,000,000 has been invested by people in San Antonio and the vicinity.

Receivership Lifted in St. Louis

Property there passed on Dec. 1 to representatives of bondholders following foreclosure

"ROLLA WELLS, receiver," ceased to function at midnight Nov. 30, as the United Railways' properties in St. Louis and St. Louis County, Mo., passed to the St. Louis Public Service Company at that time and the new owners are now in possession of the system. Rolla Wells, receiver, had been in charge of the lines since April 12, 1919.

United States District Judge Faris on Nov. 26 issued an order for delivering three of the United Railways subsidiaries to the St. Louis Public Service Company for operation at the end of November. Receiver Wells in accepting the order told the court he would turn over the entire system at the same time. A court order to that effect was prepared.

J. K. Newman, New York, head of Newman, Saunders & Company, and Frank O. Watts, president of the First National Bank in St. Louis, directed the reorganization of the United Railways properties.

A. L. Shapleigh, president of the United Railways, is to head the new company; Stanley Clarke, general counsel of the reorganization committee, will be executive vice-president and Sam W. Greenland will be in charge of operations.

The properties ordered turned over to the new company include the Missouri Electric Railroad, Florissant Construction, Real Estate & Investment Company and the Merchants Express Company, which operates lines between Wellston and St. Charles, Mo., and to other points in St. Louis County.

In his order Judge Faris pointed out that "there is no longer any necessity for continuation of the receivership." He conditioned the surrender of the railway properties upon the St. Louis Public Service Company agreeing to pay all debts, obligations and other liabilities incurred during the receivership.

Receiver Wells was also directed by the court to submit speedily a final report of his receivership so that the receivership can be legally terminated and the receiver discharged.

To facilitate the transfer of the system to the new owners the St. Louis Public Service Company asked the Public Service Commission that the existing fare schedule of the United Railways be filed in its name as of Dec. 1. The other application, by E. P. Walsh, president of the Missouri Electric Railroad, was for the filing in the name of that company the present fare rate schedule of the United Railways for the line between Wellston and St. Charles as of Dec. 1. No change in the fares was asked in either application.

With the receivership of the United Railways officially ended the St. Louis Board of Estimate and Apportionment is expected to give immediate attention to the adjustment of the city's $3,500,000 mill tax claim against the railway.

The city has the alternative of accepting either one-third in cash or two-thirds in the preferred stock of the new company. The city has until Dec. 15 to decide which settlement to accept. However, under its new charter it is prohibited from holding stock in private corporations.

The mill tax originally assessed against the railways was $2,396,321, but with interest the amount now is $3,500,000. The railway system was thrown into receivership shortly after the United States Supreme Court had upheld the legality of the mill tax.

Judge Faris of the United States District Court had classed the city as a general unsecured creditor. City officials have been fighting for full payment of the mill tax with interest to date.

Approximately 749,000,000 Passengers Carried in Canada

Electric railways of Canada carried 748,710,836 passengers in 1926, and the gross revenues were the largest in their history, but the majority of them failed to pay dividends. The net result of the operation of all electric railways was a deficit of $285,260, and two Ontario street railways, in Thomas and Peterboro, ceased operations.

Although the net income available for dividends and reserves amounted to $8,401,896, which was $1,678,017 more than in 1925, the total deductions were increased by $668,758, so that the net result of the operation of all railways was a deficit of $285,260, compared with a deficit of $1,294,519 in 1925.

During the year $2,647,010 was paid in dividends by six railways and $6,040,147 was charged to reserves and special charges by 45 of the railways. Of the 61 railways operated, 24 railways, after paying all charges, including dividends, showed surpluses aggregating $1,540,368 and the other 37 railways showed deficits amounting to $1,565,626.

The Montreal Tramways carried 207,754,983 passengers and the Toronto Street Railway 183,494,076 passengers. The British Columbia Electric Railway, which operates more mileage than either Toronto or Montreal, carried 74,018,102 passengers, while the Winnipeg Electric carried 57,985,144. The Hamilton Street Railway had 50,113,622 passengers and the Ottawa Railway 35,753,611. Fare passengers carried by the Montreal Tramways increased by 6,251,745, or 3.1 per cent, and the Toronto Transportation Commission's traffic increased by 2,714,136 fare passengers. The township of York and town of Weston, which handles urban traffic in the suburbs of Toronto, showed an increase of 3,059,044 fare passengers. The Winnipeg Electric showed an increase of 2,889,086 passengers, the Sandwich, Windsor and Amherstburg an increase of 2,138,548 passengers and

the Ottawa Electric an increase of 1,386,949 passengers.

With a few exceptions the interurban lines showed a reduced traffic and those which showed an increase handled a larger urban traffic, such as the British Columbia Electric, which showed an increase of 2,922,177 passengers. The Montreal & Southern Counties and Nipissing Central had heavier traffic than in 1925, but the Niagara, St. Catharines & Toronto reported a reduction of 1,069,824 passengers, the Windsor, Essex & Lake Shore a reduction of 105,437 passengers, and other interurban roads smaller reductions.

Would Permit Profit on Boston Reorganized Road

The Massachusetts Department of Public Utilities has authorized the Boston, Worcester & New York Street Railway to issue $2,066,000 of capital stock and $1,008,000 of bonds, in connection with the financial reorganization of the company. This is the successor company to the Boston & Worcester Street Railway, sold at receivership to a group of bondholders headed by Henry B. Rising, Boston. The sale price was $360,000.

In its order of approval the commission makes the following significant observation:

To permit the company to make a profit, if it is able to do it, based upon the proposed capitalization, will in no way impose an unfair burden upon the public, as the public will obtain the use of the property by paying a return on the value which is not in excess of the cost of replacing it and which is approximately $2,000,000 less than the amount originally invested therein.

We think it in the interest of the public that the property should be maintained and operated, if possible, and it is but justice to the bondholders that they be given an opportunity to recover, so long as no injustice is done to the public, the value of that which they advanced to the old company.

While there may be some possibility that some one of the public may be induced to give undue weight to the approval of this department of the capitalization in the purchase of the company's securities, we are of the opinion that under the circumstances that ought not to stand in the way of affecting the reorganization proposed.

We are not impressed with the argument that the sale price at the receiver's sale indicates the value of the property for street railway purposes. No one was in a position to bid very effectively at such a sale in competition with the reorganization committee, as it represented virtually all the bondholders who had assented to the reorganization plan, and the only effect of an increased price at the receiver's sale would have been to increase the amount of money which would be available to non-assenting bondholders who held less than 150 bonds.

The main purpose of the sale was to acquire title and to provide sufficient funds to meet the receiver's obligations. Reference was made to the sale in the ELECTRIC RAILWAY JOURNAL, issue of Nov. 12, page 920.

$78,504 Net Profit in Mexico City

Operation of the Mexico Tramway, Mexico City, Mexico, for the year ended Dec. 31, 1926, shows a net profit of $78,504 after deductions for tax payments and depreciation. This represents an increase of $608,759 over the results obtained during the previous year, in which a heavy loss was sustained owing to a strike that took place on the property during the first two weeks in March.

In the report of President G. R. G. Conway, recently issued, it is said that the unfavorable situation in connection with the jitney continued during the year, with some slight modifications in the jitney routes and the establishment of some crosstown lines. The number of jitneys in service, however, has declined from about 2,200 in 1924 to 1,400 at the end of 1926.

During the year there was an improvement in traffic conditions and an attempt was made by the traffic department of the Federal District toward controlling and regulating the traffic in a more satisfactory manner than had been the case in previous years. The company, with a view to meeting competition, decided to make a number of changes in the routing of the cars, to put into effect a reduced fare, to enlarge the "city" zone and to suppress on certain routes the second class service. Among the proposals for meeting the jitney competition was a scheme for selling weekly tickets for $2.50 (pesos) allowing unlimited riding throughout the enlarged city zone.

During the year 35 interurban and fourteen city cars were equipped with safety doors and steps at both ends; 36 city cars were equipped with safety doors and steps on the rear end.

In Mexican currency $1,511,388 was expended during the year for repairs and maintenance. In the same period a total of $862,293 was spent on track, overhead lines and buildings. During the year $453,901 Mexican currency was spent upon new completed and uncompleted construction work and upon reconstruction work, properly chargeable to capital account.

The accompanying table shows gross earnings, operating expenses and miscellaneous information for the year ending Dec. 31, 1926, compared with the year 1925. The thirteenth annual report includes both the statement of the board of directors and the report of the president.

STATEMENT OF OPERATIONS, MEXICO TRAMWAYS

	1926 (Mexican Currency)	1925
Car Earnings:		
Passengers	$7,483,549	$7,635,801
Monthly tickets	1,586,366	1,415,932
Chartered cars	39,378	49,251
Freight	371,576	339,050
Baggage and parcels	110,495	107,628
Funeral	182,887	211,723
Omnibus	.....	78,081
Total	$9,774,253	$9,837,468
Miscellaneous earnings	157,026	159,564
Total earnings	$9,931,280	$9,997,033
Expenses:		
Operation	$6,506,747	$6,482,819
Maintenance, taxes and depreciation	3,346,029	4,044,469
Total expenses	9,852,776	10,527,288
Net earnings from operations in Mexico	$78,504	*$530,255
Passengers carried:		
1st class	63,844,517	62,947,208
2nd class	23,090,106	22,561,126
Omnibuses	.....	510,805
	86,934,623	86,019,139
Total car mileage	18,568,009	18,090,841
Average number of passenger cars operated per day:		
Electric	389.73	379.59
Gasoline and mule cars	4.15	3.90
Omnibuses	.....	3.98
Total	393.88	387.47
Average earnings per passenger car per day	$63.86	$65.32
Average receipts per passenger car mile	.5117	.5283
Operating expenses, excluding taxes and depreciation, per car mile, passenger services	.4758	.5046
Operating expenses, including taxes and depreciation, per car mile, passenger services	.5237	.5755
Daily average earnings from operation	$27,208	$27,389
Percentage of gross expenditures, excluding taxes and depreciation, to gross earnings	89.82	92.11
Percentage of gross expenditures, including taxes and depreciation, to gross earnings	99.21	105.30

*Deficit.

Foreclosure Sought at Port Arthur

Foreclosure of a mortgage and sale of the property of the Port Arthur Traction Company, Port Arthur, Tex., is requested in a petition filed by the Dayton Savings & Trust Company of Dayton, Ohio, trustee under the terms of the indenture executed to secure the railway's first mortgage 5 per cent bonds, outstanding to the amount of $293,000. Interest on the outstanding bonds is said to be in default since July, 1926.

Portion of Seneca Falls Line Abandoned

The Public Service Commission recently granted the petitions of the Geneva, Seneca Falls & Auburn Railroad, Inc., and its receivers, Hoskins & Ryan, and approved the declaration of abandonment of a portion of its line in Seneca Falls.

It was shown by evidence at hearings and conferences that the road was operating at a loss, that foreclosure proceedings had been instituted against the company and that the abandonment of a portion of the line was proposed in the hope that savings could be made to insure partial operation.

Commissioner Brewster said that if the railroad were making a profit on the entire system, it could be held to a continuance of this line. But this was not the case and the company was faced with the determination of what was best for the public which is served by the entire road.

Legal Notes

FEDERAL SUPREME COURT — *Care Required by Truck Driver at Obscured Railroad Grade Crossing.*

The driver of a motor truck was hit by a locomotive at obscured grade crossing. He had been driving at the rate of 10 or 12 m.p.h., but had cut down his rate to 5 or 6 m.p.h. at about 40 ft. from the crossing. A good view of the track was obscured by a section house. It was daylight and the driver was familiar with the crossing. The court held: "It appears to us plain that nothing is suggested by the evidence to relieve Goodman from responsibility of his own death. When a man goes upon a railroad track he knows that he goes to a place where he will be killed if a train comes upon him before he is clear of the track. He knows that he must stop for the train, not the train stop for him. In such circumstances it seems to us that if a driver cannot be sure otherwise whether a train is dangerously near, he must stop and get out of his vehicle, though obviously he will not often be required to do more than to stop and look. It seems to us that if he relies upon not hearing the train or any signal and takes no further precaution, he does so at his own risk. If, at the last moment Goodman found himself in an emergency, it was his own fault that he did not reduce his speed earlier or come to a stop. It is true * * * that the question of due care very generally is left to the jury. But we are dealing with a standard of conduct, and when the standard is clear it should be laid down once for all by the courts. [Baltimore & Ohio R.R. vs. Goodman, 48 S. Ct., 24.]

DELAWARE — *Failure of Railroad Crossing Signal Not Necessarily Negligence.*

"While a railroad company is under no original obligation to place a signal bell, gong, or blinker light at a public crossing, yet if it has done so and has maintained the same for a long time, travelers over such crossings have a right to presume, if upon approaching said crossing the bell or gong is not ringing or the light shining, that they may pass over the crossing safely, if in the exercise of due care and caution nothing appears to the contrary. But the failure of the company to ring a signal bell at the crossing or to have the blinker lights shining or to give other due and proper warning of an approaching train would not excuse the deceased, when approaching the crossing and before going over the track, from exercising reasonable care and caution, such as an ordinarily prudent and careful man would exercise under similar circumstances." [MacRobert vs. Baltimore & Ohio Railroad, 138 At., 904.]

MISSOURI — *The Status of Person Transferring From One Car to Another.*

Street railway tracks had not been completed across a highway viaduct, and passengers were accustomed to ride as far as they could on one side, to receive a transfer, walk across the viaduct and take a car on the other side. The status of a person injured while so crossing the viaduct was held for the jury. The mere possession by him of a transfer did not necessarily make him a "passenger." [Watts vs. Fleming et al., 298 S.W., 107.]

NEW YORK — *Questions Pertinent to Be Asked by Public Service Commission.*

Under the Public Service Commission Law a witness cannot be required to answer questions unless they are material and pertinent to the purpose of the investigation being conducted. The burden of proving materiality and pertinency is on the commission. It is not sufficient that the Commission or its council deem the questions to be pertinent and legal. Questions asked of a witness as to prices paid by him for the stock of a transit corporation are irrelevant and immaterial, but questions as to the amount of stock in one transit corporation held by a competing transit corporation of which the witness was an officer and within 90 days before the investigation, were material and pertinent. A man's character and integrity are not proper subjects for investigation by an administrative body of the transit commission. [In re Dahl, 224 N.Y. Sup., 210.]

OHIO—*Conditions Under Which Supreme Court Will Reverse Commission.*

The Public Utilities Commission granted a certificate of convenience and necessity to an individual to operate a bus line without pick-up service between Steubenville and Bridgeport. The case was appealed to the Supreme Court by an existing bus line, a steam railroad and an electric railway company. The court said that it would not substitute its judgment for that of the commission as the order was not against the manifest weight of the evidence, which it did not find to be the case in this suit. [Ohio Valley Transit Co. et al. vs. Public Utilities Commission, 158 N.E., 182. (See also very similar case, Lykins vs. Public Utilities Commission, 158 N.E., 171.)]

OKLAHOMA — *Statute for Regulating the Use of Public Highways by Motor Carriers for Hire Held Valid Exercise of Public Power.*

Chapter 113 of the state laws is based on the theory that the individual citizen has no right to use the highways of the State for private enterprise to the detriment of the general public, and that where individual interest conflicts with public interest, as must be the necessary result in the use of public highways for private purposes without regulation, the government is never impotent to protect the public welfare. A private motor carrier, operating over the public highways of the state, though without regular or fixed time schedules, between fixed points in the transportation of commodities for hire under separate contracts with several business concerns, is a "motor carrier" within the meaning of the law. Hence it is subject to control and regulation by the provisions of the law. The case is differentiated from Frost vs. California Railroad Commission, as decided by the United States Supreme Court. [Barbour vs. Walker, 259 P., 552.]

PENNSYLVANIA — *Railway Not Responsible When Sharp Heel of Woman Passenger Is Caught in Groove of Curved Rail.*

A woman passenger after alighting from a car caught the sharp heel of one of her shoes in the groove of a curved rail. The groove was of the customary size, i.e., 1⅛ in. wide and 1¼ inches deep. The plaintiff had not asked to be assisted while alighting. The railway was held not responsible. [Low vs. Harrisburgh Rys., 138 At., 852.]

TEXAS—*Duty of Motorman to Automobile Stalled on Track.*

To make a railway company responsible where a motorman ran into an automobile stalled on the track, "it must appear that the driver of the street car actually saw the automobile on the track, and knew and realized the danger to its occupants in time to have, by the use of the means at hand, consistent with the safety of the street car, avoided the collision, and then failed to do so. If he had no such knowledge, the doctrine [of discovered peril] did not apply, although it appeared that by the exercise of ordinary care he might have acquired same." [Eastern Texas E. Co. vs. Smith, 298 S.W., 314.]

WASHINGTON—*Right-of-Way at Crossing Defined.*

Under the state law, street cars have a right-of-way at street intersections over other vehicles simultaneously approaching such intersections. Such right-of-way, however, must be exercised with care and with due regard to the use of the street by others. [Lung vs. Washington W. P. Co., 258 P., 832.]

Personal Items

G. H. Conklin Heads Carolinas Bureau

George H. Conklin, whose election as secretary and treasurer of the North and South Carolina Utilities Information Bureau was announced in the ELECTRIC RAILWAY JOURNAL, issue of Nov. 26, has been affiliated with the Augusta-Aiken Railway & Electric Corporation, Augusta, Ga., since 1891. From a college in Kansas he went to Augusta as secretary to the then president, Col. D. B. Dyer, who built and operated the road, with Jarvis and Conklin as partners, until they sold it in 1902. Mr. Conklin has served in nearly every department incident to the business and has been in charge of the claims department for the entire 36 years. During this time he has served with a half dozen ownerships and fifteen different managers. For the past eight years Mr. Conklin has been devoting his time and attention especially to publicity and safety, having helped to organize the safety organization.

His present title is director of public relations. As secretary and treasurer of the North and South Carolina Utilities Information Committee, to which position he was elected at the recent meeting in Charlotte, he succeeds Raymond Hunt, vice-president of the Tidewater Light & Power Company at Wilmington.

Mr. Conklin is a member of the Georgia Manufacturers Association, the Utilities Information Committee of Georgia and the Board of Commerce.

New Resident Vice-President of Pennsylvania in New York

George Le Boutillier, vice-president of the Long Island Railroad, was elected on Nov. 23 to the newly created position of resident vice-president of the Pennsylvania Railroad in New York City. This step has been taken in order that the Pennsylvania Railroad may be more adequately represented in the largest city of the country by an officer of executive rank. Mr. Le Boutillier, in his new capacity, will be in a position to deal with the questions arising at New York authoritatively as a Pennsylvania Railroad senior representative in New York City. He will also continue to serve as vice-president of the Long Island Railroad, but will, however, be largely relieved of operating details by reason of the recent appointment of R. K. Rochester to the position of general manager of the Long Island Railroad. Heretofore Mr. Rochester was assistant general manager of the Pennsylvania Railroad, stationed in New York City. As general manager of the Long Island he will personally direct its operations.

The board of directors also transferred William U. Moyer, assistant to the president and now stationed at Philadelphia, to New York City.

Mr. Le Boutillier has been in the service of the Pennsylvania Railroad for 32 years. In 1920 he was appointed general superintendent of the Eastern Pennsylvania Division, with headquarters at Harrisburg, Pa., and in 1923 was transferred to the Long Island Railroad as vice-president.

J. F. ORR, sales manager of the Idaho Power Company, has become manager of the Ogden division of the Utah Light & Power Company at Ogden, Utah. He had been engaged continuously in one field of service eighteen years.

T. F. DREW has resigned as president of the Middlesex & Boston Street Railway, Newtonville, Mass., and H. H. Hanson was elected in his place. J. L. Richards resigned as chairman and Mr. Drew was made chairman.

Friends Honor W. H. Sawyer

New president of Stevens & Wood welcomed back to New York at testimonial dinner on Nov. 28

W. H. SAWYER, recently elected president of Stevens & Wood, Inc., New York, was the guest of honor at a testimonial dinner at the Engineers Club, New York, on Nov. 28, arranged by a group of his friends in the railway and utility business so as to welcome "Bill," as he is best known among them, back as a resident of New York. The guests included men high in the councils of the utility business, whose contact and friendship with the new Stevens & Wood executive date back many years.



W. H. Sawyer

Little time was spent in dwelling upon Mr. Sawyer's ability as an engineer and an executive. His business record was so well known to those who attended the dinner that speakers confined their remarks largely to their impressions of their guest as a man and a friend. These testimonials threw into relief the many sterling qualities which have won for Mr. Sawyer a country-wide reputation for straightforward dealing, honesty of purpose and unflinching courage, tempered with tolerance and broadminded acceptance of an opposing point of view.

J. N. Shannahan, past-president of the American Electric Railway Association, acted as toastmaster. He said that it seemed eminently fit that a dinner to Bill Sawyer should be confined to a small group of personal friends, because loyalty to his friends has always been one of the outstanding characteristics of the guest of honor. Other speakers included Charles Gordon, speaking for James H. McGraw; F. R. Coates, Frank Hedley, R. P. Stevens, L. S. Storrs, T. A. Kenny and Mr. Sawyer.

Several speakers characterized Mr. Sawyer's service to the industry during the past year as president of the American Electric Railway Association as an outstanding achievement, since he had devoted himself unstintingly to the task of arousing local transportation men to an adequate appreciation of present-day public demand by preaching the gospel of a new day, of new conditions and of new demands upon the industry. The result of that work was evidenced by the Cleveland convention, with its dramatic revival of spirit and enthusiasm among manufacturers and operating executives.

ACTIVE EXECUTIVE WITH BROAD TRAINING

In commenting on Mr. Sawyer's accession to the post of president of the Stevens & Wood organization, R. P. Stevens, now chairman of the board, said that the move was dictated by the expansion of the firm's business and the need for an active executive of broad training, foresight, courage and winning personality.

After he was graduated from the University of Nebraska Mr. Sawyer had nine years of diversified experience with the General Electric Company. He then became engineer in charge of the New York office of Ford, Bacon & Davis, where he served for another nine years.

In 1914 the E. W. Clark & Company Management Corporation elected him to the position of vice-president, in which post he broadened his experience in utility management, engineering and construction. Then as president of the East St. Louis & Suburban Railway and affiliated properties for the North American Company Mr. Sawyer established a country-wide reputation for progressiveness in the face of difficult circumstances.

A great compliment was paid to his business and engineering ability when

in 1925 Mr. Sawyer was retained by the Victorian Government of Australia and appointed a Royal Commissioner to inquire into and report upon the status and affairs of the Electricity Commission of Victoria, and especially as to its power generation and distribution. He obtained a leave of absence from the North American Company to undertake this work, which was accomplished with great success.

John W. Hancock Heads Virginia Association

John W. Hancock, general manager of the Appalachian Electric Power Company, Charleston, W. Va., was elected president of the Public Utilities Association of Virginia at the recent annual convention. In this capacity he succeeds William E. Wood, Richmond, president of the Virginia Electric & Power Company.

For many years Mr. Hancock has been affiliated with the Roanoke Railway & Electric Company, which is controlled by the Appalachian Electric Power Company. In 1913 his duties were extended to include the property of the Lynchburg Traction & Light Company, Lynchburg, Va. He entered the service of the Roanoke Street Railway in 1895 and was appointed general manager when the company was reorganized early in 1900.

Mr. Hancock was born in Franklin County, Virginia, and has lived in Roanoke since 1890. Once before, in 1913, he served as president of the Public Service Association of Virginia. He is a member of the American Institute of Electrical Engineers.

Personnel Changes on Northern States Property

George H. Wilmarth, division manager of the Northern States Power Company, Eau Claire, Wis., has been appointed chief operating engineer with headquarters at Minneapolis. Mr. Wilmarth removed from Oklahoma to Wisconsin in 1923, when the Byllesby interests, with which he had been connected since 1910, acquired the Wisconsin-Minnesota Light & Power Company. He was formerly manager of the Oklahoma Gas & Electric Company at Sapulpa and in 1918 became manager of the Muskogee division. This position he occupied until 1923, when he was made vice-president and general manager of the Wisconsin-Minnesota Light & Power Company. Mr. Wilmarth succeeds M. L. Hibbard, who has resigned to accept a similar position with another company.

Harold L. Geisse succeeds Mr. Wilmarth. In addition to his duties as manager of the Wisconsin division, he will continue as general manager of the Wisconsin Valley Electric Company and affiliated companies with headquarters at Warsaw. This position he has occupied since 1921.

E. L. Graumlich Commissioner at Toledo

Has been acting street railway commissioner in Ohio city for three years. Graduate engineer

E. L. GRAUMLICH, acting street railway commissioner at Toledo, Ohio, for more than three years, was permanently appointed commissioner by Mayor F. J. Mery on recommendation of the Board of Street Railway Control during the week ended Nov. 26. The Mayor stated that Mr. Graumlich had served "loyally and well and deserved the appointment."

Mr. Graumlich went to Toledo as engineering assistant to Commissioner Wilfred E. Cann early in February, 1921, when the present Milner service-at-cost ordinance went into effect. After Mr. Cann resigned as commissioner he



E. L. Graumlich

continued to fill the vacancy and work with the board of control through the last three years.

He was graduated from Fostoria high school and took his engineering training at Case School of Applied Science, Cleveland, from which he was graduated with the class of 1918. Immediately thereafter he entered the World War service as an officer in the Coast Artillery. Previous to his graduation Mr. Graumlich worked with Fielder Sanders, then street railway commissioner in Cleveland, and it was on the basis of this experience that he was brought to Toledo.

Engaged on Several Surveys

Mr. Graumlich also did considerable work in rapid transit surveys in Cleveland and Detroit under the direction of Parsons, Klapp, Brinckerhoff & Douglas, New York. Since he has been in Toledo he has been consulted by many railway engineers from various cities anxious to study electric railway practices in Toledo.

The appointment was considered timely, particularly since there is the possibility of a change in the commissioner's office due to the progress made in the last year of negotiations toward a new railway franchise ordinance. Mr. Graumlich has been the technical adviser of the City Council and Street Railway Board of Control in all these matters. There will probably be no change in complexion of the board, at least, until February, 1929. This promises to keep intact the administration of the board and its staff through negotiations now in progress.

OBITUARY

Charles B. Manville

Charles B. Manville, 92 years old, founder of the Johns-Manville Company, died at his home in Pleasantville, N. Y., on Nov. 27. He had been ill only a few days.

When Mr. Manville retired from the Johns-Manville Company many years ago, the late Thomas Franklyn Manville, his son, became president, and upon his death the reins were taken over by another son, H. Edward Manville, who was in control until last May, when he resigned the presidency to become chairman of the board of directors of the company.

Born in Watertown, N. Y., Dec. 16, 1834, Mr. Manville emigrated to the West in one of the many pioneer waves prevalent in the '40s. He stopped in Wisconsin and there found deposits of asbestos which he developed into insulation and roofing materials and thereby laid the foundation for the company which still bears his name. He and his sons virtually acquired a monopoly on the asbestos field when they gained control of the mines in Ontario, the chief source of the mineral.

William Carpender, formerly president of the Sixth Avenue Railway, New York, N. Y., died in that city on Nov. 26. He was a financial figure in Manhattan for many years. In 1918 he was elected president of the Sixth Avenue Railway, which later became part of the New York Railways. In this capacity he succeeded the late Frank Curtiss. Mr. Carpender was 84 years old.

William P. Bonbright, founder and for many years president of the banking house of Bonbright & Company, died Nov. 10 in Roosevelt Hospital, New York. A native of Philadelphia, Mr. Bonbright entered upon his career with Hood, Bonbright & Company of that city in 1876, six years later being admitted to partnership. It was in 1920 that he retired from the presidency of Bonbright & Company, New York. This company under the leadership of Mr. Bonbright rapidly forged to the front of investment banking firms and was a pioneer in light and power securities. It has co-operated closely with the electrical industry during its development and has made notable contributions to its progress through the Bonbright survey and the Bonbright prize awards. Mr. Bonbright had many friends among utility executives and has always been an enthusiastic advocate of the utility industry. He was 68 years of age.

Manufactures and the Markets

Three Car Orders Contained in Recent Reports

Twenty-four new cars intended for two Canadian companies. New York company orders twenty subway cars

NEW car orders by the Toronto Transportation Commission and the Quebec Railway, Light & Power Company for fourteen and ten cars respectively are mentioned in recent reports. An order for twenty subway units has already been placed by the Hudson & Manhattan Railroad.

Eight combination passenger smoking and baggage compartment cars and six straight passenger cars with smoking compartments for the Toronto Transportation Commission are to be used in interurban service out of Toronto. While the cars are designed for single-end operation provision is made for operating them from the rear end in an emergency Passengers will enter and leave through the rear door only The smoking compartment will be ahead of the passenger section. Cars will be trimmed in African mahogany and genuine leather-upholstered seats, which are semi-divided, will be used. Between certain of the seats a card table can be placed for use of passengers on long trips.

The Quebec Railway, Light & Power Company, Quebec, Canada, intends purchasing ten double-truck, one-man, two-man cars for delivery next May. The cars will be 41 ft. long and will have a seating capacity of 45 passengers. In general design they will be similar to those now operated by the Montreal Tramways, Montreal, Canada.

An order for twenty subway units was placed last week by the Hudson & Manhattan Railroad, New York, with the American Car & Foundry Company.

Second International Coal Conference Will Be Held

From the Carnegie Institute of Technology in Pittsburgh comes an official announcement that a second International Conference on Bituminous Coal will be held there during the week of Nov. 19, 1928.

Gary Railways Receives Last of Sixteen Remodeled Cars

The last of the sixteen side-entrance cars formerly used on Broadway have been received by the Gary Railways, Gary, Ind., from the Cummings Car & Coach Company, Paris, Ill., where they have been remodeled into front-entrance cars with automatic doors, conforming to the type now being used generally over the lines of the company. Workmen have begun the final half of the reconstruction work on the company's North Broadway loop, where concrete pavement is being laid between the tracks; the first half of the $25,000 project was completed a short time ago, opening the northbound tracks for use. Completion of another improvement project, installation of a sprinkler system in the car shops, was also announced.

One of Georgia Power's New Units Run on Peachtree Street

One of the 40 new all-steel cars ordered by the Georgia Power Company, Atlanta, Ga., has recently been placed in service on the line running on Peachtree and Whitehall Streets. Seating plan, elevation and preliminary specifications were published in the JOURNAL Aug. 20. Most of the new cars have been delivered and the balance at that time were being received at the rate of one or two weekly, according to officials of the company.

New Locomotive Soon Ready for Indianapolis-Eastern Road

A new electric locomotive built at the Greenfield shops of the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., was recently taken through Indianapolis to the paint shops of the company at Crawfordsville to receive the finishing touches. The engine, which will be brought to Indianapolis soon to be on exhibit for a day at the traction terminal station, is said to have ten times the tractive power of the average electric car and will be used exclusively for freight haulage.

V.E.P. to Start $85,000 Job Early in 1928

Street railway tracks of the Virginia Electric & Power Company on Granby Street, between Queen and Main Streets, Norfolk, Va., will be reconstructed early next year at a cost of about $85,000, officials of the public utility company disclosed. The company is obligated, it is understood, by franchise requirements to repave between its tracks and 2 ft. on either side of them. The city of Norfolk is said to be considering repaving the street at the same time the Virginia Electric & Power Company is doing its work. City officials admit that Granby Street paving is in bad condition, it is reported, but are worried about the large slice of the small bonding margin which the improvement would absorb.

The $5,000,000 addition to the Reeves Avenue power plant will be opened early in December, according to an announcement by Thomas P. Walker, vice-president at Norfolk.

W. H. Woodin Again Heads American Locomotive Company

William H. Woodin, head of the American Car & Foundry Company, and chairman of the American Locomotive Company board of directors, was for the second time in the space of two years elected to the presidency of the American Locomotive Company, at a recent meeting of the board of directors, to succeed the late Frederick F. Fitzpatrick. Mr. Woodin's various connections with the company are, elected a director in 1919, president in 1925, chairman of the board of directors in 1927. In 1926 he resigned the presidency in favor of the late Mr. Fitzpatrick.

Permit Issued at Coral Gables to Build Municipal Carhouse

Issuance of a building permit at Coral Gables, Fla., for the first unit of the municipal carhouse, to be constructed at 134-146 Muertes Avenue, took place recently. It is understood the structure will cost about $20,000.

Copper and Lead Prices Advance in Active Metal Market

Sales of practically all metals have been phenomenally good all month and prices of copper, tin, lead and zinc have advanced as a result. Copper has done particularly well, advancing $\frac{5}{8}$ cent during the month. Lead and zinc dropped to new lows early in November, but have since more than made up the loss. Tin has been irregular, but is 1½ cents higher today than on Nov. 1.

Until Nov. 29, copper sellers generally adhered to the 13¾ cents level in the East and 13⅞ cents delivered in the Middle West, with some offerings and sales at 2½ to 5-point concessions in the East. Business Nov. 29 was so large, however, with two or three particularly heavy orders, that an overnight advance was general. On Nov. 30 sales had been made all the way between 13.80 cents delivered in the East to 14 cents in Detroit and other Mid-Western territory.

The foreign market has also been strong, and the price was advanced from 14.05 cents, c.i.f. to 14.15 cents Nov. 30.

The last week has been a quiet one for zinc, following a more active week than any other in a year or more. Prices have been well maintained at around 5.85 cents for December shipment, however, and somewhat higher for deliveries further forward. On Nov. 30 little interest by consumers was reported, but with the higher prices asked for concentrates in the Tri-State district smelters are holding firm. High-grade continues nominally at 7¾ cents delivered in the East for spot carloads. Prime Western in New York is at the customary freight differential of 35 cents per 100 lb. above St. Louis.

After maintaining its New York price for common lead at 6.25 cents per

METAL, COAL AND MATERIAL PRICES
F. O. B. REFINERY

Metals—New York	Nov. 29, 1927
Copper, electrolytic, cents per lb.	13.525
Copper wire, cents per lb.	15.50
Lead, cents per lb.	6.41
Zinc, cents per lb.	6.237
Tin, Straits, cents per lb.	59.125
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.075
Somerset mine run, Boston, net tons	1.85
Pittsburgh mine run, Pittsburgh, net tons	1.825
Franklin, Ill., screenings, Chicago, net tons	1.55
Central, Ill., screenings, Chicago, net tons	1.325
Kansas screenings, Kansas City, net tons	2.125
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	5.50
Weatherproof wire base, N.Y., cents per lb.	16.25
Cement, Chicago net prices, without bags	2.05
Linseed oil (5-bbl. lots), N. Y., cents per lb.	10.6
White lead in oil (100-lb. keg), N. Y., cents per lb.	13.25
Turpentine (bbl. lots), N. Y., per gal.	$0.55

pound for eleven weeks—since Sept. 9, when the price was cut from 6.40 cents—the American Smelting & Refining Company on Monday, Nov. 28, advanced its official quotation $1 per ton to 6.30 cents, and the next morning made a further advance to 6.40 cents. Several good sales have been made at 6.45 cents on Nov. 29 and 30. The St. Louis market was even more active than that in the East, and the price was marked up during the week from 6.075 cents to 6.22½ cents. Corroding grades of lead are commanding the usual premium of from $2 to $3 per ton.

Backing and filling have characterized the tin market during the week. London on Nov. 29 ignored a decline in the New York market on the preceding day, and as a consequence the domestic prices stiffened again. Dealers have traded actively, but consumers likewise have been in the market. Prompt Straits is not overly plentiful, and it commands a premium, though very slight, over forward positions.

Rubber and the Trade Balance

Rubber continues to play an important part in determining whether the foreign trade balance of the United States shall tilt upward or downward. An analysis of international trade of the United States for the first six months of 1927, made by the Department of Foreign Commerce of the Chamber of Commerce of the United States, shows that while exports increased, as compared with the similar period of the previous year, imports declined.

Of the total decrease of $178,000,000 in import values $137,000,000 is accounted for in the heavy decline in crude rubber prices. While rubber was slipping, silk went into the ascendent, taking first place in the rank of imports. In its analysis the department said:

> The average price of raw silk in the first half of 1927 was 65 cents a pound lower than in the same period of last year, and our imports reached the record total of 35,246,000 lb., valued at $193,385,000, a 25 per cent increase in quantity and an 11 per cent gain in value over last year's figures. The price of crude rubber declined 33 cents a pound and we imported nearly 500,000,000 lb., with a total value of $184,713,000, an 8 per cent gain in quantity, but a 43 per cent decrease in value.

ROLLING STOCK

TRI-CITY RAILWAY, Davenport, Ia., it is reported, has purchased at a cost of about $46,000 five Mack six-cylinder, 29-passenger motor coaches, which will be placed in service as soon as delivery on the order can be made. Two of the new coaches will take the place of the old coaches now operated on the 23d Avenue line in Moline and the three others are to be put into service on the Arsenal coach line, the new short cut to Moline from Davenport. It is probable that the Arsenal line will not be in operation until Jan. 1.

TRACK AND LINE

PHILADELPHIA RAPID TRANSIT COMPANY, it is reported, will install an electro-pneumatic interlocking plant for emergency operation at the Allegheny avenue station, on the Frankford elevated division. The interlocking machine will consist of eight working levers, four of which will be employed for traffic locking between adjacent towers and the others for operating the switch movements, electro-pneumatic train stops, light signals, etc., of the plant. All the interlocking apparatus is being furnished by the Union Switch & Signal Company, while the construction work will be carried out by the Philadelphia Rapid Transit Company's regular field forces.

SHOPS AND BUILDINGS

GRAYBAR ELECTRIC COMPANY, New York City, has leased a one-story brick warehouse and office building now in the course of erection in Memphis, Tenn. The new structure is located at Linden and Beale Avenues. Occupancy has been promised as of Jan. 15, 1928.

WHITE COMPANY, Cleveland, Ohio, announced a short time ago the addition of another new direct factory branch with the opening of a new building in Bronx Borough, New York City. The completed building is two stories and basement, of fireproof concrete and brick construction, and cost $250,000. It has 90,000 sq.ft. of floor space and is located on Cypress Avenue between East 132d and East 133d Streets. L. C. Watson is in charge of sales and G. F. Downing in charge of service at the Bronx branch.

NEW YORK, NEW HAVEN & HARTFORD RAILROAD, New Haven, Conn., will have its substation at Devon, Conn., finished soon, recent reports indicated. The U. G. I. Construction Company, Philadelphia, Pa., has completed its work on the substation. The balance of the electrical equipment, it was reported, would be installed at once. The station was built to feed the trolley lines of the Connecticut Company and the electrified lines of the railroad.

TRADE NOTES

MORTON MANUFACTURING COMPANY, Chicago, Ill., has announced the appointment as of Nov. 1 of H. B. Wilson, 915 Olive Street, St. Louis, Mo., to be southwestern sales manager of the railroad division of the Morton Manufacturing Company. Mr. Wilson will supervise the sale of the complete "Morton line of railway appliances."

BALDWIN LOCOMOTIVE WORKS and STANDARD STEEL WORKS COMPANY announce the removal of their offices from Suite 1210 Boatmen's Bank Building to Suite 1520 Telephone Building, 1010 Pine Street, St. Louis.

CLEVELAND FROG & CROSSING COMPANY, Cleveland, Ohio, has announced the appointment Nov. 15 of Joseph A. Donahey, heretofore sales and service engineer, as manager of sales, to succeed George Stanton, deceased.

MORSE TWIST DRILL & MACHINE COMPANY, New Bedford, Mass., has announced the opening of a store at 92 Lafayette Street, New York City, where it has put in a complete stock of its products.

LINCOLN ELECTRIC COMPANY, Cleveland, Ohio, manufacturer of "Lincweld" motors and "Stable-Arc" welders, announces the appointment of E. A. Thornwell, Atlanta, Ga., as its representative for Georgia and eastern Tennessee. Mr. Thornwell has been associated with the electrical industry in Atlanta, Ga., and Pittsburgh, Pa., since he was graduated in 1904 from Clemson College, South Carolina. John Van Horn, factory engineer for the company, has been attached to the Atlanta office to assist Mr. Thornwell.

ADVERTISING LITERATURE

ATLAS LUMNITE CEMENT COMPANY, INC., New York, has issued an illustrated brochure emphasizing the advantages of using Lumnite cement in the winter. The manufacturers advise that they will send copies to any one interested upon request.

GENERAL ELECTRIC COMPANY, Schenectady, N. Y., has issued an attractive booklet on waterwheel-driven generators, showing many hydro-electric installations using this type of generator.

TIMKEN-DETROIT AXLE COMPANY, Detroit, Mich., has recently issued a pamphlet entitled "Efficiency of F. J. Worm Gearing," which is illustrated with pictures and charts.

CROUSE-HINDS COMPANY, Syracuse, N. Y., has issued an illustrated folder descriptive of its floodlight projectors, calling attention to their industrial and other uses.



Ten motors and ten trailers of this type for the South Shore Line

Twenty more for the South Shore Lines

equipped with

"Peacock" Staffless Brakes!

Reg. U. S. Pat. Off.



The "Peacock" Staffless

Coincident with its electrification a few years ago, the Chicago, South Bend & South Shore Railroad, Michigan City, Ind. placed in service twenty-five new cars equipped with "Peacock" Staffless Brakes. They have just placed in service twenty more new steel motor and trailer cars, built by the Pullman Car & Manufacturing Company similarly equipped!

May we send you the details of this new installation and the reasons why this company and all the users of "Peacock" Staffless Brakes continuously specify them?



Interior of one of the units showing the rotating, bucket type seats

National Brake Company, Inc.

890 Ellicott Square, Buffalo, N. Y.

Canadian Representative

Lyman Tube & Supply Co., Ltd., Montreal, Can.





No. 900-D
Double Stationary Chair
Without Armrest



No. 392-A
Walkover Seat with deep springedge divided cushion and divided concave springedge back.

Seats for modern city cars—

To provide city service that has rider appeal—service that can compete on an equal basis with other forms of transportation—is an ever perplexing problem for many railways.

Excellent examples of how Hale & Kilburn Seats have helped to solve this problem for two companies are—

The No. 900-D Chairs installed in the ten new Cincinnati, Hamilton & Dayton city cars.

The No. 392-A Seats installed in the fifty new cars for the Worcester (Mass.) Consolidated Railway.

If you are planning a new car or a rehabilitation program it will pay you to investigate the complete line of H & K Seats.

One of our representatives will be glad to consult with you at any time.

HALE & KILBURN COMPANY

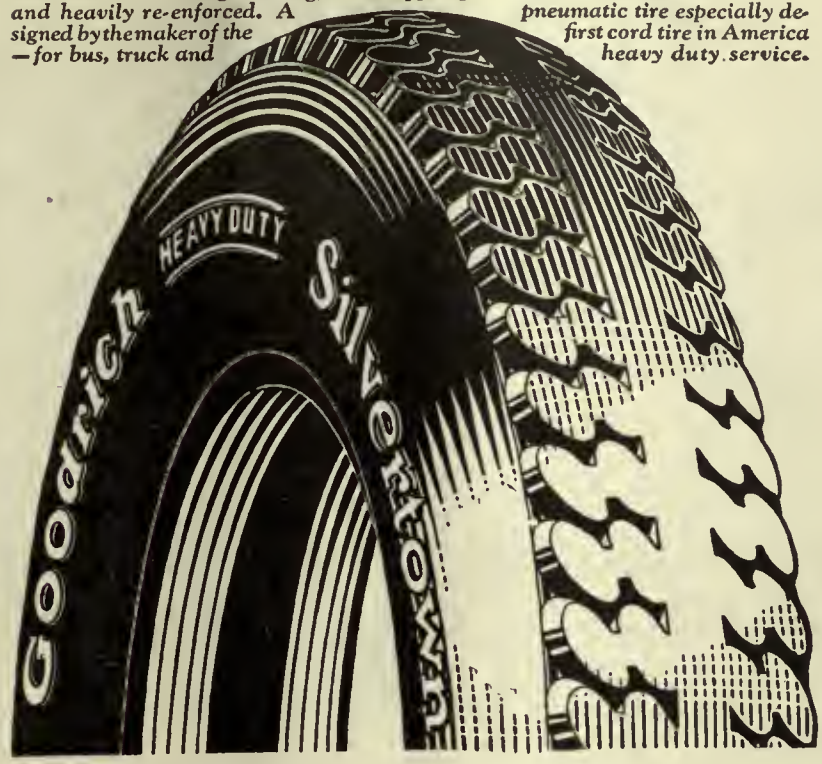
General Offices and Works: 1800 Lehigh Avenue, Philadelphia

SALES OFFICES:

Hale & Kilburn Co., Graybar Bldg., New York
Hale & Kilburn Co., McCormick Bldg., Chicago
E. A. Thornwell, Candler Bldg., Atlanta
Frank F. Bodler, 903 Monadnock Bldg., San Francisco
T. C. Coleman & Sons, Starks Bldg., Louisville
W. L. Jefferies, Jr., Mutual Bldg., Richmond
W. D. Jenkins, Praetorian Bldg., Dallas, Texas
H. M. Euler, 146 N. Sixth St., Portland, Oregon

Hale and Kilburn SEATS

Super dimensions—special rubber compound. Extra tough, heavy duty, anti-skid tread. Long-wearing, "non-rippling." Sidewalls, same stock as tread and heavily re-enforced. A pneumatic tire especially designed by the maker of the first cord tire in America —for bus, truck and heavy duty service.



After you buy them ...they cost you less!

Goodrich Heavy Duty Silvertowns begin saving the day they go on your trucks.

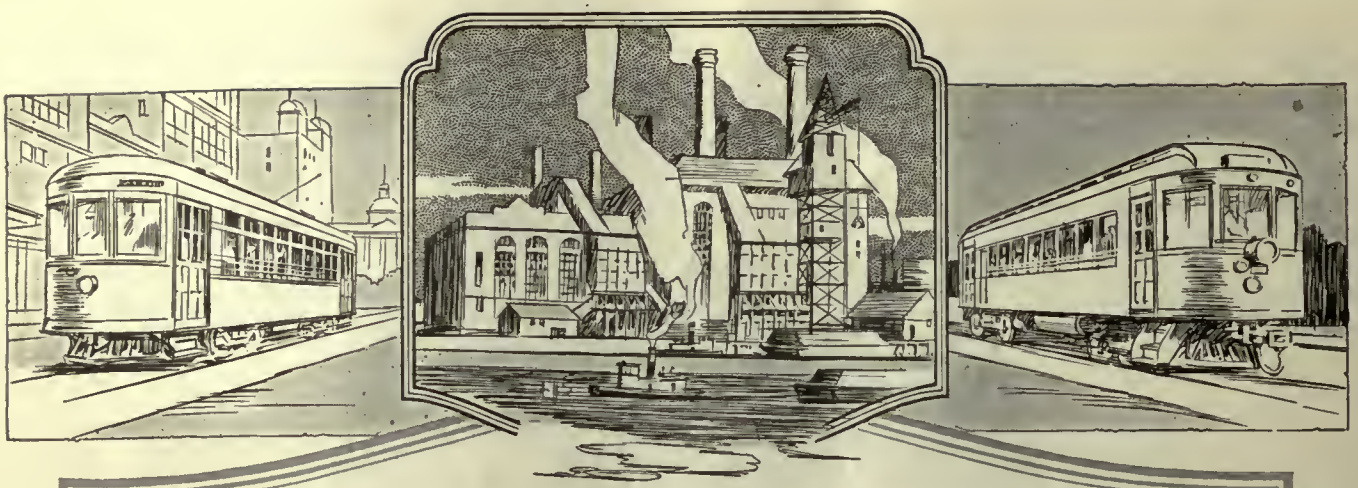
They are saving on tire costs—because their ability to deliver mileage lowers cost per mile.

They are saving delays—for they make repair stops almost unknown.

They make delivery-right-on-schedule a regular habit—and often save on overhead by giving more trips per day.

THE B.F. GOODRICH RUBBER COMPANY, *Established 1870*, Akron, Ohio
In Canada: Canadian Goodrich Company, Kitchener, Ontario

Goodrich
HEAVY DUTY
Silvertowns
HIGH PRESSURE OR BALLOON



A Straightforward Statement about *RIGHT* and *WRONG* Gear Lubrication

The right lubricant for the gears of your equipment is one that will *stick to the gears* and *stay there.*

The right lubricant is one that is *not too thin*—because a thin lubricant will be thrown off the gears; and, due to the high gear pressures, will not form the necessary film to prevent metal to metal contact.

Recognizing these facts and using the right lubricant, are the surest ways to obtain ideal gear lubrication.

And the ideal lubricant for gears is

TEXACO Crater Compound

Texaco Crater Compound is made in various grades, and each grade has the proper body to meet all operating conditions and climatic changes.

Records drawn from hundreds of thousands of car miles prove this.

Here's how Texaco Crater Compound is applied, how it works, and why it is "right":—

A small quantity of Texaco Crater Compound is put directly on to the uppermost gear teeth. After a few revolutions all the teeth of all the gears are coated with a protective film of "Crater."

This film is enough for perfect lubrication. It checks wear. It doesn't hold chips or dirt.

It doesn't fly around the casing.

Periodic inspection will show that the lubricant stays on the gears for an unusually long time, and when required you need add only a small amount.

This method has been found to be most effective and economical. You don't waste lubricants, yet you save gears.

We shall be glad to demonstrate—on one car or a dozen—how thoroughly Texaco Crater Compound will lubricate gears.

There is a Texaco Lubricant for Every Purpose

Rolling Stock, Power Plant, Sub-station, Everywhere.

THE TEXAS COMPANY
Texaco Petroleum Products
17 BATTERY PLACE, NEW YORK CITY
Department ED-1
OFFICES IN PRINCIPAL CITIES



Illustrated above is a typical example of the model Service Stations originated by the Firestone Service Station Development Department. Designed for quick, efficient tire service.

FIRESTONE Service Program Saves Money for Bus Lines

Thousands of Firestone Dealers are equipped to render an unusual service to bus lines, as a result of the Firestone Greater Service Station Program.

Firestone has established a separate department with a corps of engineers, architects and building experts, to carry on this work with dealers all over the country. These specialists develop the newest types of service stations, prepare the plans and give every assistance in arranging for complete bus tire service.

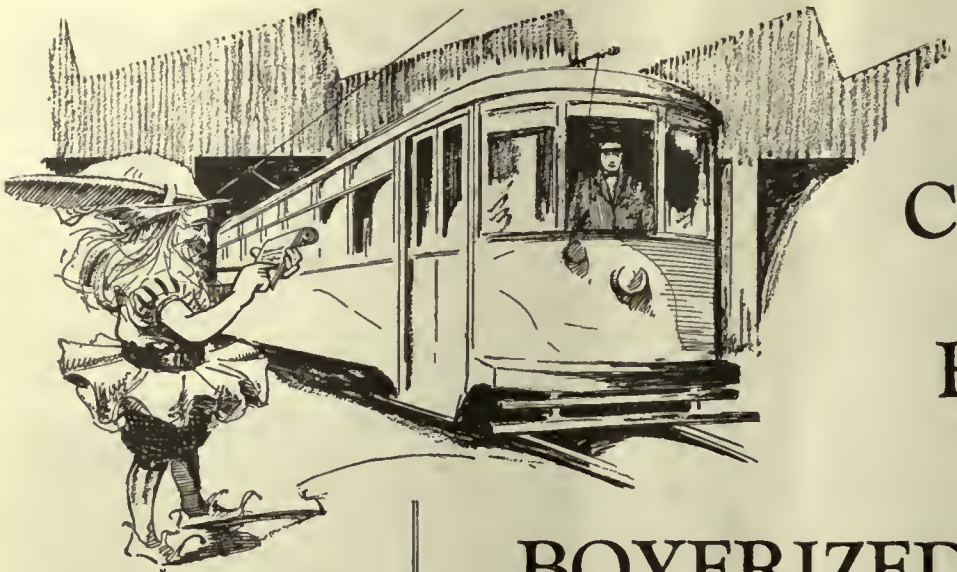
Firestone also supplies the dealer with specially designed repair equipment and conducts schools at the factories and principal branch cities where latest repair methods are taught. Educational meetings are held with dealers to instruct them in Firestone tire design and show them how to aid drivers and shop men to get maximum mileage.

Thus supplied and equipped, and backed by the enormous resources of the world-wide Firestone organization, Firestone Dealers can give bus operators the greatest value obtainable—in both quality tire equipment and efficient service.

The Mark of Quality

MOST MILES PER DOLLAR

AMERICANS SHOULD PRODUCE THEIR OWN RUBBER.. Harvey S. Firestone



Check up *the* Results!

BOYERIZED PARTS

last three to four times longer!

The experience of users proves it repeatedly. *Boyerize* one or more cars for a test. Keep actual comparative cost and performance records—then figure actual results for yourself. You will also agree that to Boyerize is to economize.

In a nutshell, Boyerizing gives car parts a life equal to three or four times that of ordinary steel. Yet the cost of Boyerized Parts is low!

Write today for detailed information and quotations. Or pick from the list such Boyerized Parts as you may need immediately and let us ship you a trial order.

- Brake Pins
- Brake Hangers
- Brake Levers
- Pedestal Gibs
- Brake Fulcrums
- Center Bearings
- Side Bearings Spring Post Bushings
- Brake Bushings
- Bronze Bearings
- Bolster and Transom Chafing Plates
- Spring Posts
- McArthur Turnbuckles
- Manganese Brake Heads
- Manganese Truck Parts



Bemis Car Truck Company

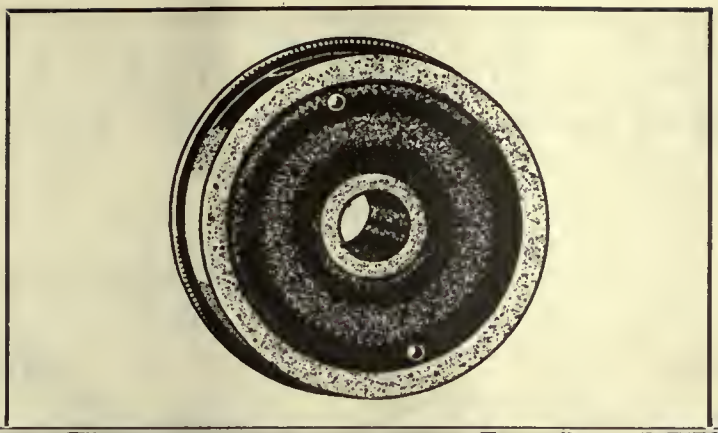
Electric Railway Supplies

Springfield, Mass.

Representatives:

Economy Electric Devices Co., Old Colony Bldg., Chicago, Ill.
F. F. Bodler, 903 Monadnock Bldg., San Francisco, Cal.
W. F. McKenney, 54 First Street, Portland, Ore.
L. H. Denton, 1328 Broadway, New York City, N. Y.
A. W. Arlin, 519 Delta Building, Los Angeles, Cal.







Springfield Street Ry. Co.

THE 50 cars recently built for this Railway by the Wason Mfg. Co. were equipped with "Standard" 26-in. rolled steel wheels.

Rolled Steel Wheels
Springs Axles
Armature Shafts

STANDARD STEEL WORKS COMPANY

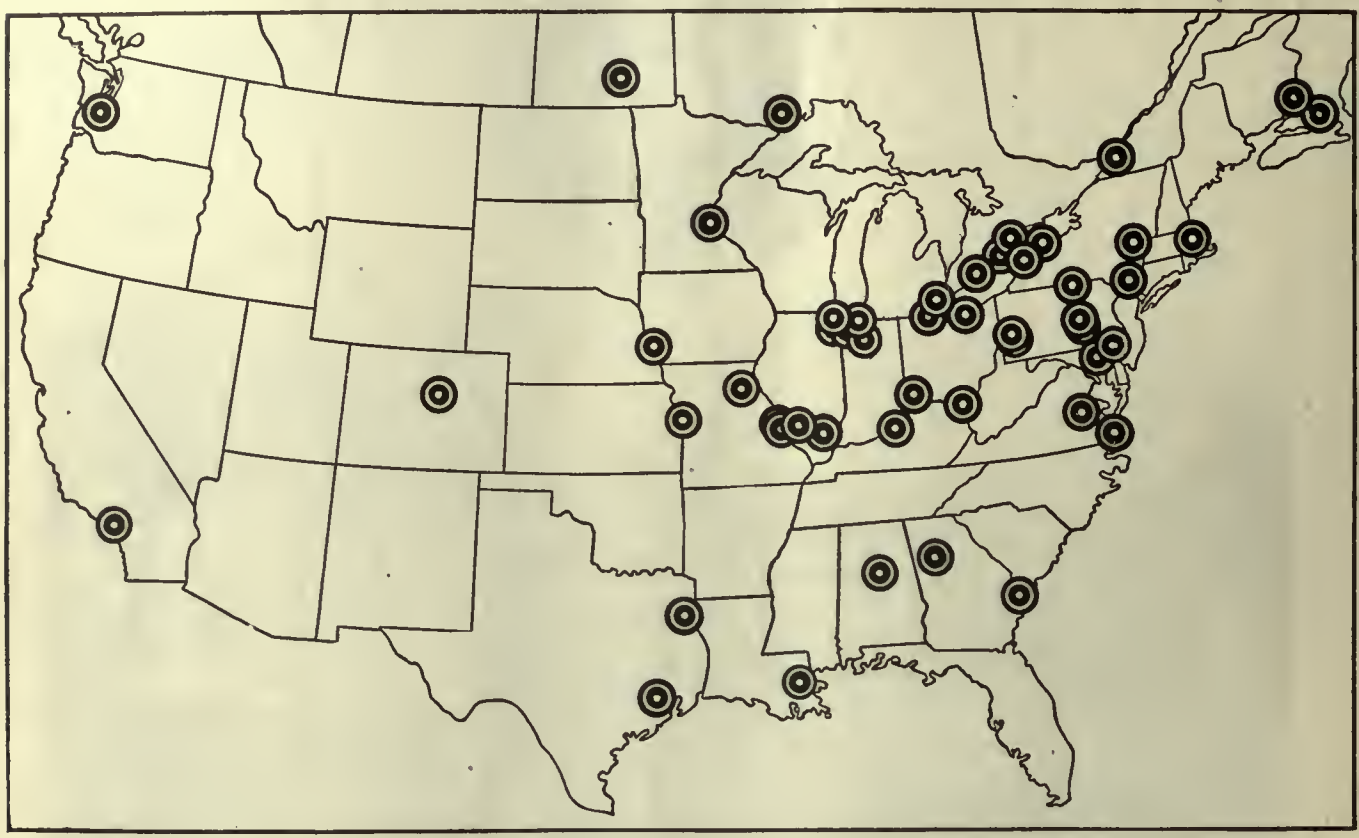
PHILADELPHIA, PA.

BRANCH OFFICES

CHICAGO
ST. LOUIS
NEW YORK
HOUSTON
PORTLAND
RICHMOND
SAN FRANCISCO
ST. PAUL
PITTSBURGH
MEXICO CITY

WORKS: BURNHAM, PA.

58 PLANTS — DAILY CAPACITIES, 20,000 WHEELS



Chilled Tread Wheels

Look at the Map

An added economy for the buyer is the short haul in any location on new and scrap Chilled Tread Wheels... All of our foundries are associated in operating on the same constructive program.

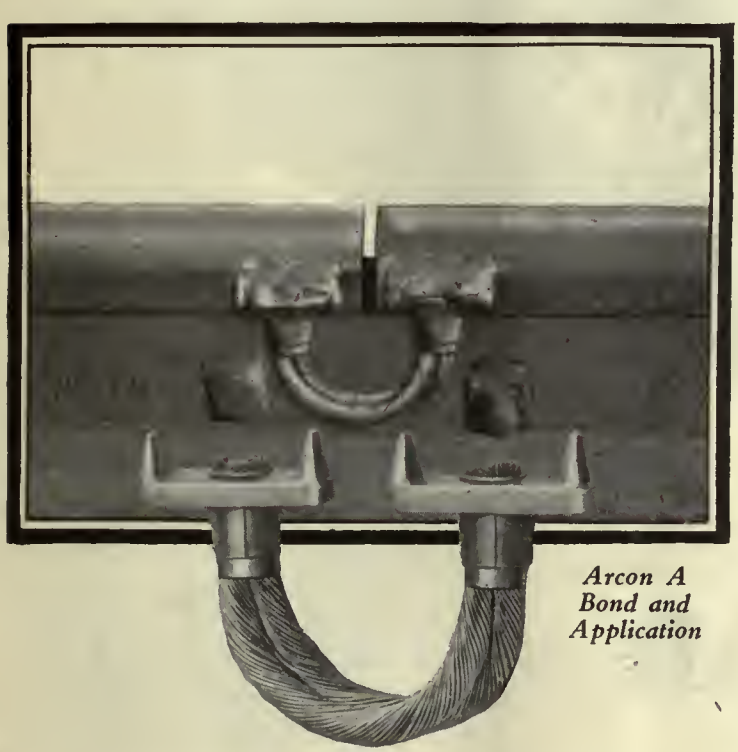
Better every year

ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS
1847 McCORMICK BUILDING · CHICAGO

Albany Car Wheel Company
American Car & Foundry Company
Bass Foundry & Machinery Company
Brown Car Wheel Works
Canada Iron Foundries
Canadian Car & Foundry Company
Central Car Wheel Company
Dickson Car Wheel Company
Dominion Wheel & Foundries
Griffin Wheel Company
Hannibal Car Wheel and Foundry Company
Lobdell Car Wheel Company
Louisville Car Wheel & Railway Supply Company
Marshall Car Wheel Company
Maryland Car Wheel Company
Mt. Vernon Car and Manufacturing Company
New York Car Wheel Company
Pullman Car and Manufacturing Corporation
Ramapo Foundry and Wheel Works
Reading Car Wheel Company
Southern Wheel Company
Tredegar Iron Works

ARCON RAIL BONDS

TRADE MARK REG.



Arcon A Bond and Application

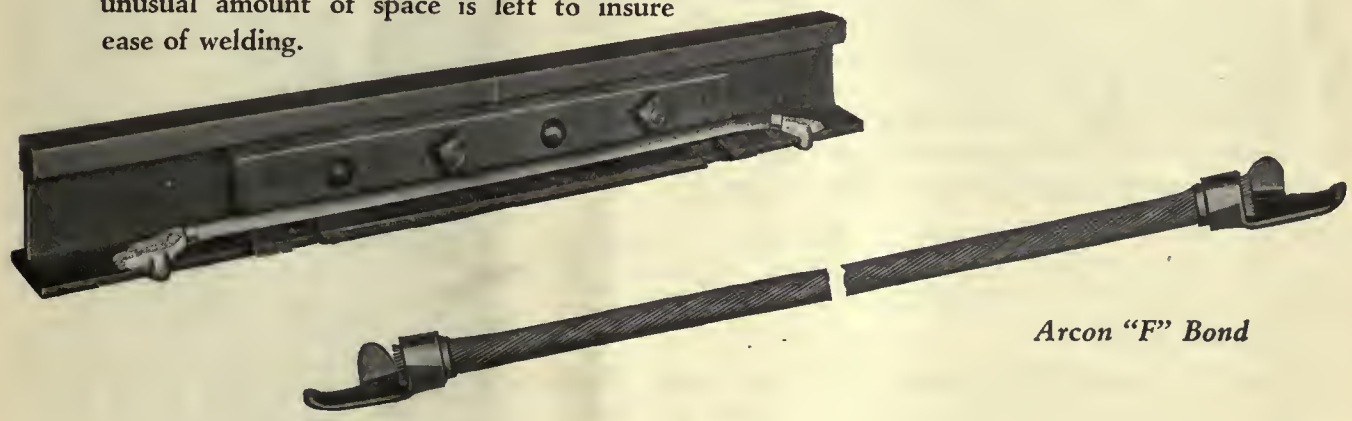
Arcon bonds make positive the welding of bonds with copper electrodes.

All unnecessary retaining walls have been omitted from these bonds. There are no box shaped metal pockets to interfere with directing the arc.

The open shape of the Arcon "A" terminal is especially desirable since the arc can be directed freely at the junction of the terminal and the rail.

Prices and descriptive literature sent on request.

To Apply the Arcon "F" bond, hammer it onto the rail base and proceed to weld. The pointed hook holds the bond securely in place and will fit between tie and rail. An unusual amount of space is left to insure ease of welding.



Arcon "F" Bond

AMERICAN STEEL & WIRE COMPANY

Sales Offices

Chicago New York Boston Cleveland Worcester Philadelphia Pittsburgh Buffalo Detroit Cincinnati Baltimore
Wilkes-Barre St. Louis Kansas City St. Paul Oklahoma City Birmingham Memphis Dallas Atlanta Denver Salt Lake City
Export Representative: U. S. Steel Products Co., New York
Pacific Coast Representative: U. S. Steel Products Company, San Francisco, Los Angeles, Portland, Seattle



TUBULAR STEEL POLES



THE experience of leading street railway companies throughout America with their overhead construction points to less interruption to service, lower upkeep, greater reliability and longer life of the installation when these poles are used. There is another advantage of tubular poles—their straightness and general uniformity give a neat appearance to the street wherever used.

Besides electric railway service, these poles are adaptable to electric transmission; signal; telephone, telegraph and street lighting service, and are particularly adaptable for combination services.

Bulletin No. 14—"NATIONAL" Tubular Steel Poles—contains information on manufacture, installation and service conditions, and tables of sizes, weights, lengths, etc. This Bulletin will be sent on request.

NATIONAL TUBE COMPANY, PITTSBURGH, PA.

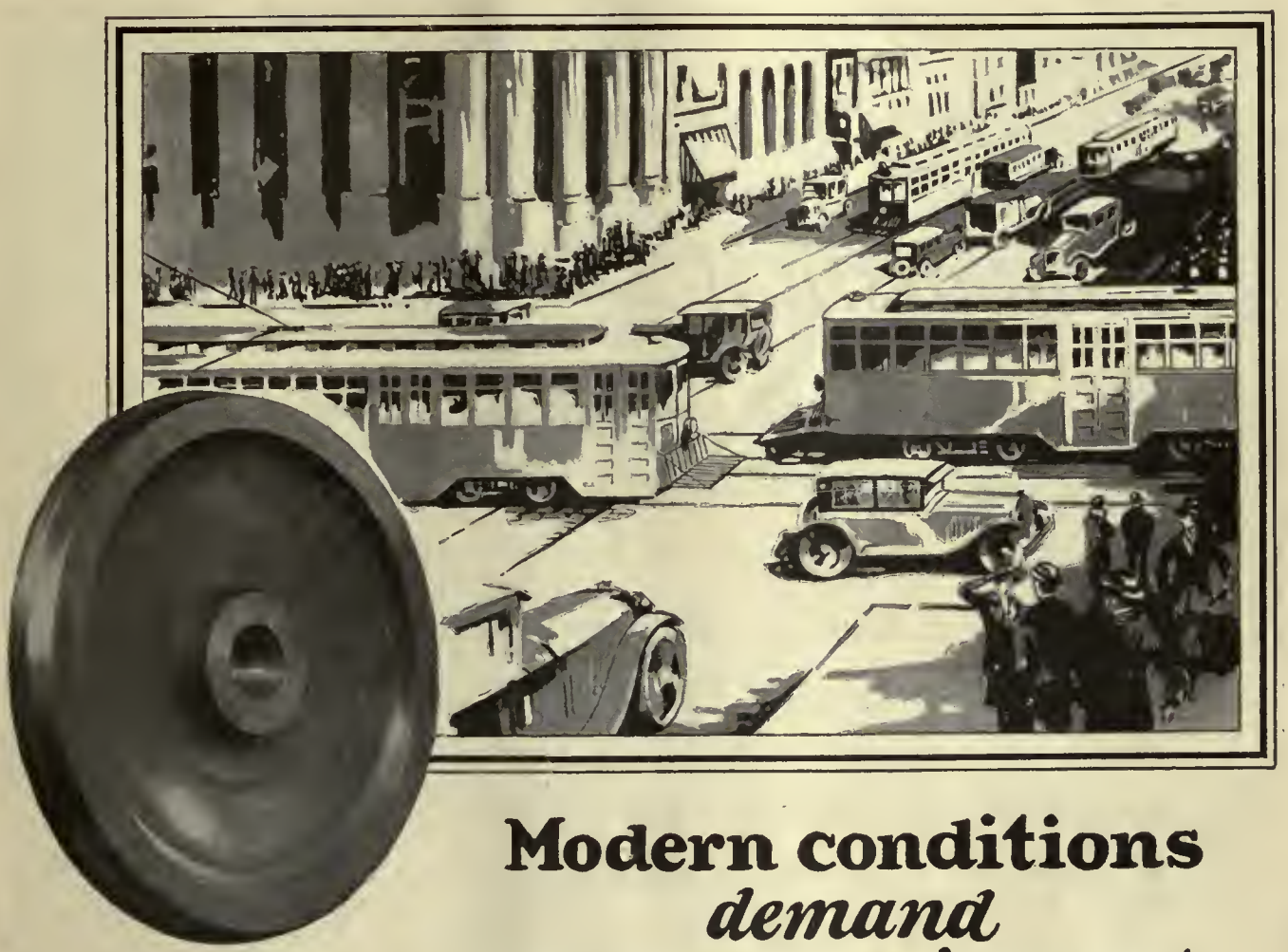
GENERAL SALES OFFICES: FRICK BUILDING

DISTRICT SALES OFFICES

Atlanta Boston Chicago Denver Detroit New Orleans New York Salt Lake City Philadelphia Pittsburgh St. Louis St. Paul

Pacific Coast Representatives: U. S. Steel Products Co. San Francisco Los Angeles Portland Seattle

Export Representatives: U. S. Steel Products Co. New York City



Modern conditions *demand* modern equipment

Traffic conditions today are not what they were fifteen or twenty years ago. Equipment suitable then is now inadequate. Bigger cars, heavier loads, constant stopping and starting throw an ever increasing burden on equipment. Wheels bear the brunt of this burden.

Carnegie Wrought Steel Wheels assure high resistance to the wear and tear of modern traffic conditions. Wrought Steel is obtained through rolling and forging. A 10,000 ton hydraulic press (twenty-million pounds!) forces the defects out of the steel—insures a homogeneous structure, free from sand spots, blow holes, or other irregularities that might cause trouble. The rolling process rolls the mileage into the steel—mileage to spare. It is this extra mileage that makes Carnegie Wheels such an economical investment.

Before you invest in new wheels, investigate Wrought Steel. A catalogue will be sent at your request. Or one of our engineers will call, if you wish.

CARNEGIE STEEL COMPANY

General Offices • Carnegie Building • 434 Fifth Avenue

PITTSBURGH PENNSYLVANIA

1882

ANNUAL

Statistical and *Forecast* *Number*

Electric Railway Journal
January 14, 1928

This important number will contain:

Record of 1927 in costs and revenues.

Number of cars purchased.

Miles of track constructed and reconstructed.

Financial records for 1927.

Reviews of basic tendencies in legal, financial and regulatory matters.

A review of the significant news developments of 1927.

Together with:

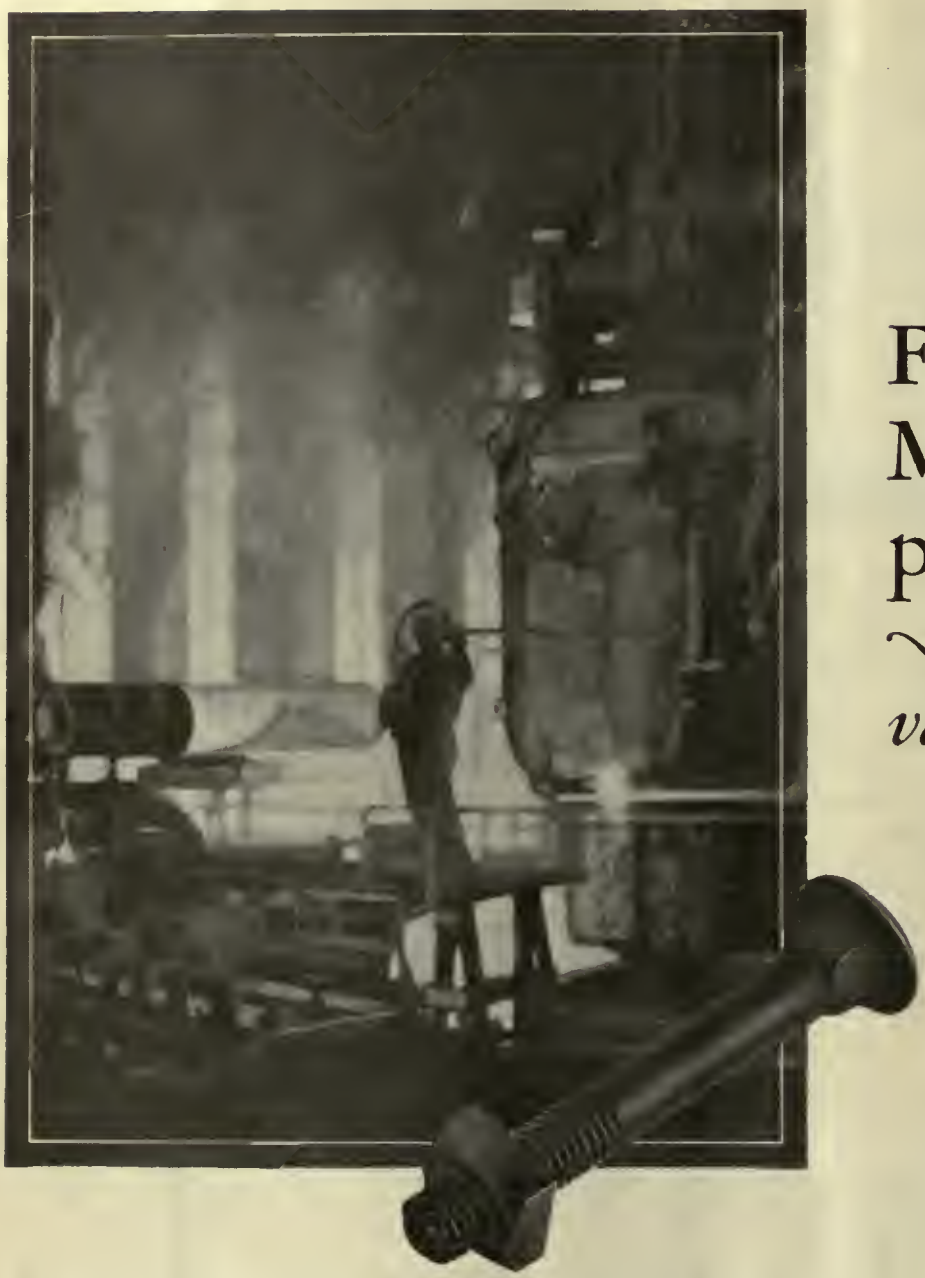
A forecast of 1928 expenditures in all departments, and the trends which will shape developments and progress of 1928.

Advertising forms close January 3, 1928

Electric Railway Journal
Tenth Ave. at 36th St., New York City

Member ABC Member ABP


FIRE
RESISTANT
LONG experience has proved indisputably that Creosoted Pine Poles are fire resistant. When a creosoted pole starts to burn, there begins to form on its surface a coating of carbon (soot) from the decomposition of the creosote. This coating quickly thickens and acting as an insulator against the heat, protects the wood fibre underneath. The deposit excludes oxygen—and without oxygen wood cannot burn. So the flame soon smothers itself out before it does any material damage to the pole.
This fire resistant feature is very important in areas where grass fires occur yearly and where pole lines are located along the railroad right of way.
Illustration shows International Creosoted Pine Poles in Power Line, Port Neches to Port Arthur, Texas, in service of the Texas Company.
International Creosoting & Construction Co.
Texarkana—Beaumont—Galveston
Distributed by GraybaR
International
Creosoted Yellow Pine Poles



From Steel Mill to Shipping Case *~ held to unvarying limits!*

The secret of the marvelous accuracy and strength of the Empire Bolt

To keep millions of bolts within the same unvarying limits of strength and accuracy requires a constant checking of limits at every stage of their manufacture.

The steel from which Empire *New Process* Bolts are made must be uniform as to quality, not only today, but tomorrow, next month, next year. The marvelous automatic machines that form the head must be unfailingly accurate. The dies that form the Empire *New Process* thread must never vary from their gauge-like limits. The heat treatment must unfailingly keep the tensile strength above 80,000 lbs.

The day-in and day-out accomplishment of these seeming impossibilities is the reason there is only one Empire *New Process* Bolt.

RUSSELL, BURDSALL & WARD
BOLT & NUT COMPANY
PORT CHESTER, N.Y.
Branch Office: Sears Building CHICAGO
Branch Office: General Motors Bldg. DETROIT
Branch Factory ROCK FALLS, Ills.
Strength & Calkins 160 Jackson Street SEATTLE
Marshall & Marshall, Inc. 118-168 Fifteenth Street SAN FRANCISCO
Makers of Bolts, Nuts and Rivets Since 1842

EMPIRE *New Process* BOLTS

OVER 80,000 LBS. TENSILE STRENGTH



Precast reinforced concrete trestle on the Atlantic Coast Line Railway, near Dinsmore, Florida.

The caps were cast in place—all other members were precast.

For Railway Trestles

ONE of the most obvious advantages of concrete railway trestles is fire-safety—they cannot burn! This fact alone has justified their installation by many progressive lines.

Concrete of definite, *predetermined* strength and durability is necessary to make effective the details of the design. This can be attained by following the standard specification for concrete adopted by the American Railway Engineering Association.

This specification is reprinted in our new pamphlet "Railway Trestles of Concrete." Your copy will be sent on request.

PORTLAND CEMENT ASSOCIATION, 33 West Grand Avenue, Chicago

PORTLAND CEMENT

CONCRETE

for permanence



U S 20 A Trolley Base with Timken Bearings

Lubricating the Car Roof!

Sounds funny, don't it? Yet that is what a lot of trolley bases do. The grease for lubricating the swivel is packed into an inverted cup, and on the first warm day it melts and runs past the leather gaskets and other ineffectual arrangements designed to retain it and out onto the car roof.

Not only wasting lubricant but making the roof unsightly.

The grease reservoirs in the Nuttall U S 20 A trolley base are so arranged that while the lubrication of the Timken roller bearings is perfect, it is impossible for the grease to leak out. Thus, it is possible to always maintain a clean roof, and the base needs lubrication only once in every six months.

Send for our Bulletin No. 46

R.D.NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

All Westinghouse Electric & Mfg. Co. district offices are sales representatives for Nuttall Railway Products

Canadian Agent,
Lyman Tube & Supply Co., Montreal

MEMBER AERA 1927

Nuttall



Complete satisfaction

Operating perfectly and requiring minimum attention for maintenance and lubrication, Earll Catchers and Retrievers give genuinely satisfactory results. Their refinement of design, and mechanical superiority are summarized in the following five features, peculiar to Earll construction.

No-wear Check Pawl
Free-Winding Tension Spring
Ratchet Wind
Emergency Release
Perfect Automatic Lubrication

Earll Catchers and Retrievers

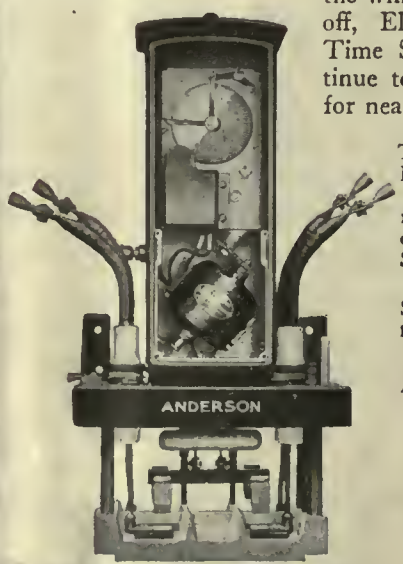
C. I. EARLL, York, Pa.

Canadian Agents:
Railway & Power Engineering Corp., Ltd., Toronto, Ont.
In All Other Foreign Countries:
International General Electric Co., Schenectady, N. Y.

This Time Switch winds itself

Think of the convenience of never having to wind up Time Switches, leaving that job to the sturdy, well-built electric motors contained inside the Switches.

It means a saving of time and labor, too—and a constant insurance against forgetfulness. Even if the winding current is cut off, Electrically Wound Time Switches will continue to operate as usual for nearly three days.



Type SL double pole oil break with oil tank and door removed. Front plate also removed showing winding motor.

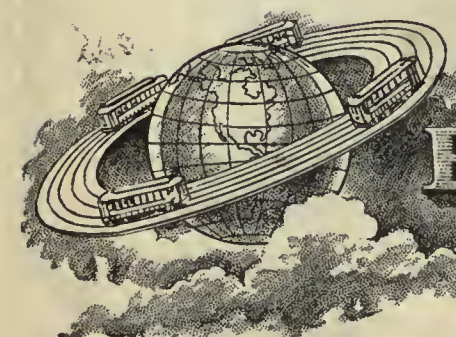
The illustrated Bulletin No. 37 contains 48 pages, telling more about these dependable Time Switches.

Send for your copy today.

Albert & J. M. Anderson Mfg. Co.
289-305 A St.
BOSTON, MASS.

NEW YORK
CHICAGO
PHILADELPHIA
LONDON

JUST as the electric railway companies have to compile and be guided by exhaustive statistics as to peak loads, traffic densities, costs per mile, and so forth, we must constantly keep ourselves informed as to purchasing power, density of population and all vital market information in order to maintain our service as an active asset of your service.



Barron G. Collier
INCORPORATED
CANDLER BLDG. NEW YORK

Griffin Wheel Company

410 North Michigan Ave.
Chicago, Ill.

Griffin Wheels

with
Chilled Rims
and
Chilled Back of Flanges
For Street and Interurban Railways

FOUNDRIES:

Chicago	Boston	St. Paul
Detroit	Kansas City	Los Angeles
Denver	Council Bluffs	Tacoma
Cleveland	Salt Lake City	Cincinnati

PANTASOTE

TRADE MARK

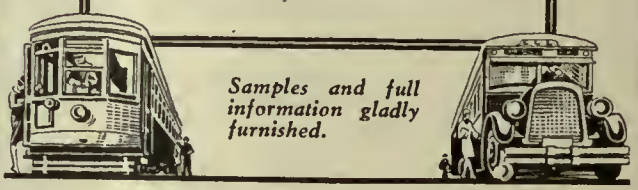
—the car curtain and upholstery material that pays back its cost by many added years of service. Since 1897 there has been no substitute for Pantasote.

AGASOTE

TRADE MARK

—the only panel board made in one piece. It is homogeneous and waterproof. Will not separate, warp or blister.

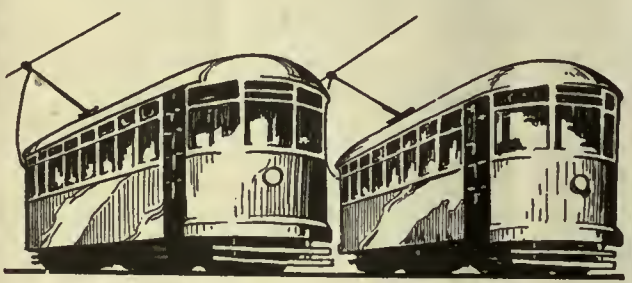
Standard
for electric railway cars
and motor buses



Samples and full information gladly furnished.

The PANTASOTE COMPANY, Inc.
250 Park Avenue, NEW YORK

M-J Armature Babbitt





No less than twenty-five different grades of Babbitt have been successfully perfected in the More-Jones line, designed for various services and at varying prices. "Armature" for electric railways is the recognized standard. *Let us quote you.*

National Bearings Metal Corporation
St. Louis, Mo.

"MORE-JONES QUALITY PRODUCTS"

Why



Le Carbone Carbon Brushes?

Reason No. 16

When carbon brushes cause you trouble you resent them. When they do *not* cause you trouble you *forget* them. Adopt "Le Carbone" Carbon Brushes for both power house and cars and you soon will have forgotten that you ever suffered from brush trouble or expense.

They talk for themselves

W. J. Jeandron
Factory Terminal Bldg.
Fifteenth Street, Hoboken, N. J.
Pittsburgh Office: 634 Wabash Bldg.
Chicago Office: 1657 Monadnock Block
San Francisco Office: 525 Market Street
Canadian Distributors: Lyman Tube & Supply Co., Ltd.
Montreal and Toronto

The OHMER System

REG. U. S. PAT. OFF.



checks and audits *every fare*

OHMER Registers enforce the collection of correct fares. The registration is shown either by a public indicator, by a printed receipt, or by a combination of both, depending upon the type of register. This prevents any discrepancy between the amount collected and the amount registered.

As the fares are rung up, the register keeps a permanent and unalterable record for auditing purposes. That insures correct accounting, for the cash turned in by the operator must tally with the amount recorded in the register.

No one can estimate the enormous saving of traffic revenue effected by the OHMER principle of fare registration during the last thirty years.

OHMER Fare Registers or OHMER Ticket-Printing Registers are indispensable for ticket offices, street cars, traction cars, buses, ferries, toll-bridges, and other places where cash fares are collected or where tickets, transfers, or receipts are required. If you are not now using OHMER Registers, let us suggest a system that will exactly meet your needs. *Write or wire today.*



OHMER FARE REGISTER CO.

DEPT. Y, DAYTON, OHIO, U. S. A.



SONKA SO TUTU

That is the Kaffir term for Bread of Ashes.

Instead of being baked in an oven it is done under a covering of hot ashes.

The native fishes it out of the ashes gives it a wipe and tells you that it is **reasonably** free of ash.

But you who have been reared on lily-white, wax-papered bread wouldn't agree with him, any more than would the user of Morganite carbon brushes agree that the user of nondescript brushes gets **reasonably** good service from them.

Just how reasonable is **reasonable** as an excuse?

Morganite Brush Co., Inc.

Main Office and Factory
3302-3320 Anable Ave., Long Island City, N. Y.

DISTRICT ENGINEERS AND AGENTS

Pittsburgh, Electrical Engineering & Mfg. Co., 909 Penn Ave.
Cincinnati, Electrical Engineering & Mfg. Co., 607 Mercantile Library Building.
Cleveland, Electrical Engineering & Mfg. Co., 320 Union Building.
Baltimore, O. T. Hall, Sales Engineer, 432 North Calvert St.
Revere, Mass., J. F. Drummey, 75 Pleasant Street.
Los Angeles, Special Service Sales Co., 502 Delta Building.
San Francisco, Special Service Sales Co., 202 Russ Building.
Toronto, Can., Railway & Power Engineering Corp., Ltd., 101 Eastern Ave.
Montreal, Can., Railway & Power Engineering Corp., Ltd., 68-70 St. Antoine St.
Winnipeg, Can., Railway & Power Engineering Corp., Ltd., P. O. Box 325.



Time is the great test. The most efficient and permanent insulation known is

KERITE

KERITE INSULATED WIRE & CABLE COMPANY
NEW YORK CHICAGO

Use a *natural* cleaner!

OAKITE cleaning materials are *natural cleaners*. They clean by emulsification—as they come in contact with grease, oil and dirt Oakite materials quickly penetrate, loosen, and break them up into small particles. Then, rinsing easily removes every trace from the surface to which they were adhering.

This is purely a physical—and natural action. Chemical action is unnecessary. The washing of cars and cleaning of parts in the shop are done better, faster, and more economically the *natural* Oakite way. Our Service Man will explain in detail how these materials can be adapted to your work. Write for him to call. No obligation.

Oakite Service Men, cleaning specialists, are located in the leading industrial centers of the U. S. and Canada

Oakite is manufactured only by
OAKITE PRODUCTS, INC., 28B Thames St., NEW YORK, N. Y.
(Formerly OAKLEY CHEMICAL CO.)

OAKITE
TRADE MARK REG. U. S. PAT. OFF.
Industrial Cleaning Materials and Methods

COLUMBIA MACHINE WORKS

COLUMBIA

Railway Supplies and Equipment

Machine and Sheet Metal Work

Forgings Special Machinery and Patterns

Grey Iron and Brass Castings

Armature and Field Coils.

The Columbia Machine Works *and M. I. Co.*
265 Chestnut St., corner Atlantic Ave.,
Brooklyn, New York



JOHNSON FARE COLLECTING SYSTEMS

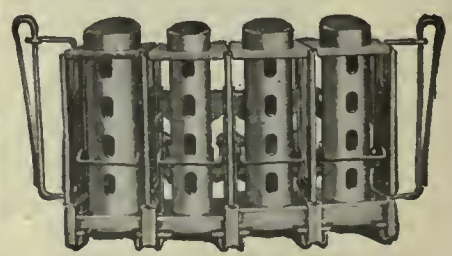


Johnson Electric Fare Boxes and overhead registers make possible the instantaneous registering and counting of every fare. Revenues are increased 1½ to 5% and the efficiency of one-man operation is materially increased. Over 4000 already in use.

When more than two coins are used as fare, the Type D Johnson Fare Box is the best manually operated registration system. Over 50,000 in use.

Johnson Change-Makers are designed to function with odd fare and metal tickets selling at fractional rates It is possible to use each barrel separately or in groups to meet local conditions. Each barrel can be adjusted to eject from one to five coins or one to six tickets.





Johnson Fare Box Co.
4619 Rovenswood Ave., Chicago, Ill.



Gifford-Wood WAGE$AVER Street Ice Leveler, operated from boom on derrick car, leveling ice on street outside of tracks. Cumberland Light and Power Co., Portland, Me.

Gifford-Wood WAGE$AVER STREET ICE LEVELER

Does more work than 100 men!

"THE Gifford-Wood WAGE$AVER Street Ice Leveler dug out more ruts yesterday than would have been broken up by 100 men with picks," said Surveyor Daniel F. Cronin of Manchester, N. H., last winter.

The Cumberland Light and Power Co., of Portland, Maine, advise that their Gifford-Wood WAGE$AVER sometimes cuts as fast as 10 miles per hour.

Keep tracks and streets open for automobile traffic this winter! Get the facts on this effective, wage saving ice-leveling equipment.

Levels ice between rails. Cuts out the humps between wheel ruts in street outside of rails.

Easily operated. Inexpensive. In leveling between tracks may be trailed behind car or drawn by tractor or horse. In leveling outside of tracks may be tractor, truck or horse-drawn or operated from boom as illustrated.

Write for Bulletin 1027

It contains complete information, photographs, specifications. Address nearest office below.

GIFFORD-WOOD CO. 39 Hill St., Hudson, N. Y.
New York:.....420 Lexington Ave.
Chicago:.....565 W. Washington St.
San Francisco:.....1274 Folsom St.



R 11 Double Register

Both our latest single and double registers are now equipped for electric as well as mechanical hand or foot operation.

Full Electric Operation of Fare Registers

A completely satisfactory fare registration system is one that has the confidence of the public, the conductor and the accounting department. The simplicity and accuracy of International Registers maintained for more than thirty years, is combined in the later types with the extra speed and convenience of electric operation.

The International Register Co.
15 South Throop St., Chicago

ELECTRICAL INSULATION

PERFECT MICANITE INSULATOR and PERFECT EMPIRE INSULATION

Micanite and Super-Micanite Sheets, Commutator Segments, and Commutator Rings.

Micanite Tubes and Washers

Linotape, Seamless or Sewn Bias
(Yellow or Black Varnished Tapes)

Empire Oiled Cloths and Papers
(Yellow or Black)

Compounds, Varnishes, Etc.

Send for catalog and helpful booklet on Commutator Insulation and Assembly

MICA INSULATOR COMPANY
Largest manufacturers in the world of mica insulation.
Established 1893.
New York: 68 Church St. Chicago: 542 So. Dearborn St.
Cleveland Pittsburgh Cincinnati
San Francisco Los Angeles Seattle
Works; Schenectady, New York. Victoriaville, Canada; London, England

Bankers and Engineers

Ford, Bacon & Davis
Incorporated
Engineers
115 Broadway, New York
PHILADELPHIA CHICAGO SAN FRANCISCO

The J. G. White Engineering Corporation
Engineers—Constructors
Oil Refineries and Pipe Lines, Steam and Water Power Plants, Transmission Systems, Hotels, Apartments, Office and Industrial Buildings, Railroads.
43 Exchange Place New York

STONE & WEBSTER
Incorporated
Design and Construction
Examinations Reports Appraisals
Industrial and Public Service Properties
NEW YORK BOSTON CHICAGO

THE BEELER ORGANIZATION
Transportation, Traffic, Operating Surveys
Better Service—Financial Reports
Appraisals—Management
52 Vanderbilt Ave. New York

SANDERSON & PORTER
ENGINEERS
PUBLIC UTILITIES & INDUSTRIALS
Design Construction Management
Examinations Reports Valuations
CHICAGO NEW YORK SAN FRANCISCO

J. ROWLAND BIBBINS
Engineer—2301 Connecticut Ave., N.W., Washington, D. C.
TRANSPORTATION SURVEYS
Organized Traffic Relief and Transit Development
Co-ordinating Motor Transport, Railroad and City Plans, Service, Routing, Valuation, Economic Studies
EXPERIENCE IN 20 CITIES

ALBERT S. RICHEY
ELECTRIC RAILWAY ENGINEER
WORCESTER, MASSACHUSETTS
REPORTS - APPRAISALS - RATES - OPERATION - SERVICE

ENGELHARDT W. HOLST
Consulting Engineers
Appraisals Reports Rates Service Investigation
Studies on Financial and Physical Rehabilitation
Reorganization Operation Management
683 Atlantic Ave., BOSTON, MASS.

LINN & MARSHALL, *Inc.*
Financing — Engineering — Management
PUBLIC UTILITIES
ELECTRIC RAILWAYS — MOTOR BUSES —
GAS — ELECTRIC
25 Broadway, New York City

DAY & ZIMMERMANN, INC.
ENGINEERS
DESIGN - CONSTRUCTION - REPORTS
VALUATIONS - MANAGEMENT
NEW YORK PHILADELPHIA CHICAGO

STEVENS & WOOD
INCORPORATED
ENGINEERS AND CONSTRUCTORS
120 BROADWAY, NEW YORK
ENGINEERING CONSTRUCTION YOUNGSTOWN, O. FINANCING MANAGEMENT

WALTER JACKSON
Consultant on Fares and Motor Buses
The Weekly and Sunday Pass—Differential Fares—Ride Selling
Holbrook Hall 5-W-3
160 Gramatan Ave., Mt. Vernon, N. Y.

HEMPHILL & WELLS
CONSULTING ENGINEERS
Gardner F. Wells Albert W. Hemphill
APPRAISALS
INVESTIGATIONS COVERING
Reorganization Management Operation Construction
43 Cedar Street, New York City

KELKER, DELEUW & CO.
CONSULTING ENGINEERS
REPORTS ON
Operating Problems Valuations Traffic Surveys
111 W. Washington Street, Chicago, Ill.

E. H. FAILE & CO.
Designers of
Garages— Service Buildings—Terminals
441 LEXINGTON AVE. NEW YORK

McCLELLAN & JUNKERSFELD
Incorporated
ENGINEERING AND CONSTRUCTION
Examinations—Reports—Valuations
Transportation Problems—Power Developments
68 Trinity Place, New York
Chicago St. Louis

THE BABCOCK & WILCOX COMPANY

85 LIBERTY STREET, NEW YORK

Builders since 1868 of Water Tube Boilers of continuing reliability

BRANCH OFFICES

BOSTON, 80 Federal Street
PHILADELPHIA, Packard Building
PITTSBURGH, Farmers Deposit Bank Building
CLEVELAND, Guardian Building
CHICAGO, Marquette Building
CINCINNATI, Traction Building
ATLANTA, Candler Building
PHOENIX, ARIZ., Heard Building
DALLAS, TEX., Magnolia Building
HONOLULU, H. T., Castle & Cooke Building
PORTLAND, ORE., Gasco Building



WORKS
Bayonne, N. J.
Barberton, Ohio

Makers of Steam Superheaters since 1898 and of Chain Grate Stokers since 1893

BRANCH OFFICES

DETROIT, Ford Building
NEW ORLEANS, 344 Camp Street
HOUSTON, TEXAS, Electric Building
DENVER, 444 Seventeenth Street
SALT LAKE CITY, Kearns Building
SAN FRANCISCO, Sheldon Building
LOS ANGELES, Central Building
SEATTLE, L. C. Smith Building
HAVANA, CUBA, Calle de Aguiar 104
SAN JUAN, Porto Rico, Royal Bank Building

A. L. DRUM & COMPANY

Consulting and Constructing Engineers

VALUATION AND FINANCIAL REPORTS
RATE STUDIES FOR PRESENTATION TO PUBLIC SERVICE COMMISSIONS
CONSTRUCTION AND MANAGEMENT OF ELECTRIC RAILWAYS

230 South Clark Street, Chicago, Ill.

C. B. BUCHANAN, President — W. H. PRICE, JR., Sec'y-Treas. — JOHN F. LAYNG, Vice-President

BUCHANAN & LAYNG CORPORATION

Engineering and Management, Construction
Financial Reports, Traffic Surveys
and Equipment Maintenance

BALTIMORE, 1004 Citizens National Bank Bldg. — Phone: Hanover: 2142 — NEW YORK, 49 Wall Street

TRAFFIC CONSULTANT

Freight Rate, Tariff and Traffic Analyses;
Advisory Freight Traffic Assistance on Special or Monthly Basis;
Preparation of Cases before Interstate Commerce Commission and State Commissions.

HALSEY McGOVERN
Mills Bldg., 17th and Pa. Ave., Washington, D. C.

THE P. EDWARD WISH SERVICE

50 Church St. NEW YORK — *Street Railway Inspection* DETECTIVES — 131 State St. BOSTON

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

TULC — A LUBRICANT

We make a specialty of

ELECTRIC RAILWAY LUBRICATION

We solicit a test of TULC on your equipment

The Universal Lubricating Co.

Cleveland, Ohio

Chicago Representatives: Jamieson-Ross Company, Straus Bldg.

PS HEATERS

Car Heating and Ventilating

—are no longer operating problems. We can show you how to take care of both with one equipment. The Peter Smith Forced Ventilation Hot Air Heater will save, in addition, 40% to 60% of the cost of any other car heating and ventilating system. Write for details.

The Peter Smith Heater Company
6209 Hamilton Ave., Detroit, Mich.

UNA

RAIL JOINTS
DYNAMOTORS
WELDING ROD

UNA Welding & Bonding Co.
Cleveland, Ohio.



Gets Every Fare

PEREY TURNSTILES or PASSIMETERS

Use them in your Prepayment Areas and Street Cars

Perey Manufacturing Co., Inc.
101 Park Avenue, New York City

"Bates Poles Outlive the Bond Issues that Buy Them"

BATES POLES AND STRUCTURES

BEST — Bates Expanded Steel Truss Co.

General Offices and Plants
EAST CHICAGO, INDIANA, U. S. A.

THE WORLD'S STANDARD

"IRVINGTON"

Black Varnished Silk, and Yellow Varnished Cambric, Varnished Paper

Irv-O-Slot Insulation — Flexible Varnished Tubing
Insulating Varnishes and Compounds

Irvington Varnish & Insulator Co.
Irvington, N. J.

Sales Representatives:

Mitchell-Rand Mfg. Co., N. Y.
E. M. Wolcott, Rochester
I. W. Levine, Montreal
A. L. Gillies, Toronto
Prehler Brothers Inc., Chicago
White Supply Co., St. Louis
Clapp & LaMoree, Los Angeles
Martin Woodard, Seattle
Consumers' Rubber Co., Cleveland

AMERICAN BRIDGE COMPANY

EMPIRE BUILDING—71 BROADWAY NEW YORK, N. Y.

Manufacturers of Steel Structures of all classes particularly BRIDGES AND BUILDINGS

ALSO STEEL BARGES FOR HARBORS AND RIVERS, STEEL TOWERS FOR ELECTRIC TRANSMISSION, HEROULT ELECTRIC FURNACES, ETC.

SALES OFFICES:

NEW YORK, N.Y. Philadelphia, Pa. Boston, Mass. Baltimore, Md.
PITTSBURGH, PA. Cincinnati, Ohio Cleveland, Ohio Detroit, Mich.
CHICAGO, ILL. St. Louis, Mn. Denver, Colo. Salt Lake City, Utah Duluth, Minn. Minneapolis, Minn.
Pacific Coast Representative: U. S. Steel Products Co., Pacific Coast Dept. San Francisco, Cal. Los Angeles, Cal. Portland, Ore. Seattle, Wash.

Export Representative: United States Steel Products Co., 30 Church Street, New York.

Bethlehem Products for Electric Railways

Tee and Girder Rails; Machine Fitted Joints; Splice Bars; Hard Center Frogs; Hard Center Mates; Rolled Alloy Steel Crossings; Abbott and Center Rib Base Plates; Rolled Steel Wheels and Forged Axles; Tie Rods; Bolts; Tie Plates and Pole Line Material.

Catalog Sent on Request

BETHLEHEM STEEL COMPANY, Bethlehem, Pa.

BETHLEHEM

TISCO MANGANESE STEEL SPECIAL TRACKWORK

Wharton *Tisco* Manganese Steel Trackwork will help you hold the up-keep down.

WM. WHARTON JR. & CO., INC.
Easton, Penna.

B. A. HEGEMAN, Jr., President H. A. HEGEMAN, First Vice-Pres. and Treas.
F. T. SARGENT, Secretary W. C. PETERS, Vice-Pres. Sales and Engineering

National Railway Appliance Co.

Graybar Building, 420 Lexington Ave., New York

BRANCH OFFICES

Munsey Bldg., Washington, D. C. 100 Boylston St., Boston, Mass.
Hegeman-Castle Corporation, Railway Exchange Building, Chicago, Ill.

RAILWAY SUPPLIES

Tool Steel Gears and Pinions
Anglo-American Varnish Co., Varnishes, Enamels, etc.
National Hand Holds
Genesco Paint Oils
Dunham Hopper Door Device
Garland Ventilators
Walter Tractor Snow Plows
Feasible Drop Brake Staffs
Ft. Pitt Spring & Mfg. Co., Springs
Flaxlinum Insulation
Economy Electric Devices Co. Power Saving and Inspection Meters
National Safety Devices Company's Whistle Blowers, Gong Ringers and Brake Hangers
Godward Gas Generators
Cowdry Automotive Brake Testing Machine

Atlanta
Baltimore
Boston
Buffalo
Chicago
Cincinnati
Cleveland
Dallas
Detroit
Indianapolis
Kansas City
Los Angeles
Milwaukee
Minneapolis
New Orleans
New York
Philadelphia
Pittsburgh
San Francisco
St. Louis
Syracuse
Seattle
Washington, D. C.
Berlin, Germany

Investigations • Reports
Valuations

The American Appraisal Company

A National Organization



FARE
BOXES for BUSES

Let us tell you of this especially designed box for this class of service.

The Cleveland Fare Box Co.
4900 Lexington Ave., Cleveland, O.
Canadian Cleveland Fare Box Co., Ltd.
Preston, Ontario

COIN COUNTING And Sorting Machines CHANGE CARRIERS Tokens

Lorain Special Trackwork Girder Rails

Electrically Welded Joints

THE LORAIN STEEL COMPANY
Johnstown, Pa.
Sales Offices:
Atlanta Chicago Cleveland New York Philadelphia Pittsburgh Dallas
Pacific Coast Representative:
United States Steel Products Company
Los Angeles Portland San Francisco Seattle
Export Representative:
United States Steel Products Company, New York, N. Y.

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.

Positions Vacant and all other classifications, 8 cents a word, minimum charge $2.00.

Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.

Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

1 to 3 inches.....$4.50 an inch
4 to 7 inches..... 4.30 an inch
8 to 14 inches..... 4.10 an inch

Rates for larger spaces, or yearly rates, on request.

An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

POSITION VACANT

ADVERTISING man for city and interurban electric railway in the East. P-63, Electric Railway Journal, Tenth Ave. at 36th St., New York.

POSITIONS WANTED

EQUIPMENT supervisor, thoroughly experienced and successful in maintenance of city, interurban cars and buses, desires to change location. PW-61, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

GENERAL superintendent or manager; fifteen years' successful experience. PW-55, Electric Railway Journal, Tenth Ave. at 36th St., New York.

MAN with wide experience in trolley and bus maintenance open for engagement; references. PW-64, Electric Railway Journal, Tenth Ave. at 36th St., New York.

LOOKING FOR WORK? A position wanted advertisement here, outlining your qualifications and experience, will give you the proper introduction to executives of the Electric Railway Field, seeking men for the kind of position you want.



Tie Plates
—Switches—Frogs
—Portable Track
Finest Quality
Flat Cars—Locomotives
Quick Delivery *Lowest Price*

HYMAN-MICHAELS CO.
Peoples Gas Building
St. Louis CHICAGO San Francisco

FOR SALE

15 BIRNEY SAFETY CARS

Brill Built
West, 506 or G. E. 264 Motors
Cars Complete—Low Price—Fine Condition
ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

WANTED

Interurban Cars

Interurban railway desires to purchase ten thoroughly modern, light-weight, steel Interurban Cars. These should be standard gage with maximum speed of 50 m.p.h. on 600-volt D.C. system. Must have small baggage compartment and be suitable for one-man operation. Address offers with specifications to

W-65, Electric Railway Journal
Tenth Ave. at 36th St., New York City

WANTED

MOTORS

14—Second-hand Westinghouse 532 S.B. Motors.

The Stenbenville, East Liverpool & Beaver Valley Traction Company
East Liverpool, Ohio

"Opportunity" Advertising:

Think "*SEARCHLIGHT*" First!

0100

WANTED

FARE BOXES

20—Used Johnson Type D, in good condition, registering dimes, nickels and cents, in cents.

VIRGINIA PUBLIC SERVICE CO.
Hampton, Va.

If there is anything you want—

or something you don't want that *other* readers of this paper can supply—or use—advertise in the

SEARCHLIGHT SECTION

Somebody is always looking for something to meet certain business needs. Some men in charge of plant operations may be in the market for good used equipment—others may have just what they want, to sell. Some may require a man of unusual qualifications for a particular position—that man may be another reader of this paper!

Put the Searchlight Section to work for you under any of the following classifications—to fill your business needs.

Agencies Wanted
Agents Wanted
Auction Notices
Buildings For Sale
Business Opportunities
Civil Service Opportunities
Contracts To Be Let
Contracts Wanted
Educational Courses
Employment Agencies
Exchanges
For Rent Items
Franchises
Industrial Sites
Miscellaneous Wants
New Industries Wanted
Partners Wanted
Patents For Sale
Patent Attorneys
Plants For Sale
Positions Vacant
Positions Wanted
Property For Sale
Receivers' Sales
Representative Wanted
Salesmen Wanted
Work Wanted
Etc., Etc., Etc.

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Brakes
General Electric Co.
Westinghouse Air Brake Co.

Anchors, Guy
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Appraisals
American Appraisal Co.

Armature Shop Tools
Columbia Machine Works
Elec. Service Supplies Co.

Automatic Return Switch Stands
Ramapo Ajax Corp.

Automatic Safety Switch Stands
Ramapo Ajax Corp.

Axles
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Cincinnati Car Co.
St. Louis Car Co.
Standard Steel Works Co.
Westinghouse E. & M. Co.

Babbitt Metal
National Bearings Corp.

Babbitting Devices
Columbia Machine Works

Badges and Buttons
Elec. Service Supplies Co.
International Register Co.

Barges, Steel
American Bridge Co.

Batteries, Dry
Nichols-Lintern Co.

Bearings and Bearing Metals
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works
National Bearings Corp.
St. Louis Car Co.
Westinghouse E. & M. Co.

Bearings, Center and Roller Side
Columbia Machine Works
Stucki Co., A.

Bells and Buzzers
Consolidated Car Heating Co.

Bells and Gongs
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works
Elec. Service Supplies Co.
St. Louis Car Co.

Benders, Rail
Railway Track-work Co.

Bodies, Bus
Brill Co., The J. G.
Cummings Car & Coach Co.
Graham Brothers
St. Louis Car Co.

Body Material, Haskelite and Plymetl
Haskelite Mfg. Corp.

Boilers
Babcock & Wilcox Co.

Boiler Tubes
National Tube Co.

Bolts, Nuts, Rivets
Russell, Burdsall & Ward Bolt & Nut Co.

Bond Testers
American Steel & Wire Co.
Electric Service Supplies Co.

Bonding Apparatus
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.

Bonds, Rail
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, etc.)
American Bridge Co.
Bates Expanded Steel Truss Co.
Columbia Machine Co.
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Brill Co., The J. G.
Cincinnati Car Co.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
American Brake Shoe & Foundry Co.
Bemis Car Truck Co.
Brill Co., The J. G.
St. Louis Car Co.
Wheel Truing Brake Shoe Co.

Brakes, Brake Systems and Brake Parts
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Co.
General Electric Co.
National Brake Co.
St. Louis Car Co.
Westinghouse Tr. Br. Co.

Brakes, Magnetic Rail
Cincinnati Car Co.

Bridges, Steel
American Bridge Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
Morganite Brush Co., Inc.
Westinghouse E. & M. Co.

Brushes, Graphite
Morganite Brush Co., Inc.

Brushholders
Columbia Machine Works
General Electric Co.

Buildings, Steel
American Bridge Co.

Bulkheads
Haskelite Mfg. Corp.

Bunkers, Coal
American Bridge Co.

Buses
Cummings Car & Coach Co.
General Electric Co.

Bushings, Case Hardened & Manganese
Brill Co., The J. G.
Bemis Car Truck Co.
Cincinnati Car Co.
Columbia Machine Works
St. Louis Car Co.

Cables. (See Wires and Cables)

Cambric Tapes, Yellow and Black Varnish
General Electric Co.
Irvington Varnish & Ins. Co.

Cambric Yellow and Black Varnish
Mica Insulator Co.

Carbon Brushes (See Brushes, Carbon)

Car Lighting Fixtures
Elec. Service Supplies Co.

Car Panel Safety Switches
Consolidated Car Heat. Co.
Westinghouse E. & M. Co.

Car Steps, Safety
Cincinnati Car Co.

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Cars, Dump
Brill Co., The J. G.
Differential Steel Car Co., Inc.
St. Louis Car Co.

Cars, Gas-Electric
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co.

Cars, Gas, Rail
Brill Co., The J. G.
St. Louis Car Co.

Cars, Passenger, Freight, Express, etc.
Amer. Car Co.
Brill Co., The J. G.
Cincinnati Car Co.
Cummings Car & Coach Co.
Kuhlman Car Co., G. C.
St. Louis Car Co.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Cars, Self-Propelled
Brill Co., The J. G.

Castings, Brass Composition or Copper
Anderson Mfg. Co., A. & J. M.
Cincinnati Car Co.
Columbia Machine Works
National Bearings Corp.

Castings, Gray Iron and Steel
American Bridge Co.
American Steel Foundries
Bemis Car Truck Co.
Columbia Machine Works
St. Louis Car Co.
Standard Steel Works Co.

Castings, Malleable & Brass
Bemis Car Truck Co.
Columbia Machine Works
St. Louis Car Co.

Catchers and Retrievers, Trolley
Earll, C. I.
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Ceiling Car
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Ceilings, Plywood, Panels
Haskelite Mfg. Corp.

Cement Products
Portland Cement Co.

Change Carriers
Cleveland Fare Box Co.
Electric Service Supplies Co.

Change Trays
Cincinnati Car Co.

Circuit-Breakers
Anderson Mfg. Co., A. & J. M.
General Electric Co.
Westinghouse E. & M. Co.

Clamps and Connectors for Wires and Cables
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Cleaners
Oakite Products

Cleaners and Scrapers, Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.

Coal and Ash Handling (See Conveying and Hoisting Machinery)

Coil Banding and Winding Machines
Columbia Machine Works
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

Coils, Armature and Field
Columbia Machine Works
General Electric Co.
Westinghouse E. & M. Co.

Coils, Choke and Kicking
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Coin Counting Machines
Cleveland Fare Box Co.
International Register Co.
Johnson Fare Box Co.

Coin Changers
Johnson Fare Box Co.

Coin Sorting Machines
Cleveland Fare Box Co.
Johnson Fare Box Co.

Coin Wrappers
Cleveland Fare Box Co.

Commutator Slotters
Columbia Machine Works
Elec. Service Supplies Co.
Westinghouse E. & M. Co.
Wood Co., Chas. N.

Commutators or Parts
General Electric Co.
Westinghouse E. & M. Co.

Compressors, Air
General Electric Co.
Westinghouse Tr. Br. Co.

Condensers
Westinghouse E. & M. Co.

Condensor Papers
Irvington Varnish & Ins. Co.

Connectors, Solderless
Westinghouse E. & M. Co.

Connectors, Trailer Car
Columbia Machine Works
Consolidated Car Heat. Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Controllers or Parts
Columbia Machine Works
General Electric Co.
Westinghouse E. & M. Co.

Controller Regulators
Elec. Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse E. & M. Co.

Converters, Rotary
General Electric Co.
Westinghouse E. & M. Co.

Conveying & Hoisting Machinery
American Bridge Co.

Copper Wire
American Brass Co.
American Steel & Wire Co.
Anaconda Copper Mining Co.

Copper Wire Instruments, Measuring, Testing and Recording
American Brass Co., The
American Steel & Wire Co.
Anaconda Copper Mining Co.

Cord, Bell, Trolley, Register, etc.
American Steel & Wire Co.
Brill Co., The J. G.
Elec. Service Supplies Co.
International Register Co.
Roebling's Sons Co., John A.
Samson Cordage Works
St. Louis Car Co.

Cord Connectors and Couplers
Elec. Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
American Steel Foundries
Brill Co., The J. G.
Cincinnati Car Co.
Ohio Brass Co.
St. Louis Car Co.
Westinghouse Tr. Br. Co.

Cowl Ventilators
Nichols-Lintern Co.

Cranes, Hoists and Lifts
Buda Co., The
Electric Service Supplies Co.

Cross Arms (See Brackets)

Crossings
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossing Foundations
International Steel Tie Co.

Crossings, Frog and Switch
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossing Signals. (See Signal Systems, Highway Crossing)

Crossings, Track (See Track, Special Work)

Crossings, Trolley
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Curtains & Curtain Fixtures
Brill Co., The J. G.
Pantasote Co., Inc.
St. Louis Car Co.

Cutting Apparatus
General Electric Co.
Ohio Brass Co.
Railway Track Work Co.

Dealer's Machinery & Second Hand Equipment
Elec. Equipment Co.
Hyman Michaels Co.

Derailing Switches
Ramapo Ajax Corp.

Destination Signs
Columbia Machine Works
Elec. Service Supplies Co.

Detective Service
Wish Service, Edward P.

Door Operating Devices
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Heat. Co.
National Pneumatic Co.

Doors and Door Fixtures
Brill Co., The J. G.
Cincinnati Car Co.
Hale-Kilburn Co.
St. Louis Car Co.

Doors, Folding Vestibule
National Pneumatic Co.

Drills, Track
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Dryers, Sand
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Ears
Columbia Machine Works
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Electric Transmission Towers
American Bridge Co.

Electric Grinders
Railway Track-work Co.

Electric Locomotives
St. Louis Car Co.

Electrical Wires and Cables
Amer. Electrical Works
Amer. Steel & Wire Co.
John A. Roebling's Sons Co.

Electrodes, Carbon
Railway Track-work Co.
Una Welding & Bonding Co.

Electrodes, Steel
Railway Track-work Co.
Una Welding & Bonding Co.

Engineers, Consulting, Contracting and Operating
Beeler, John A.
Bibbins, Rowland J.
Buchanan & Layng Corp.
Day & Zimmermann, Inc.
A. L. Drum & Co.
Faile & Co., E. H.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & DeLeuw
Linn & Marshall Co.
McClellan & Junkersfeld
McGovern Halsey
Richey, Albert S.
Sanderson & Porter
Stevens & Wood
Stone & Webster
White Eng. Co., J. G., The

Engines, Gas, Oil or Steam
Westinghouse E. & M. Co.

Exterior Side Panels
Haskelite Mfg. Corp.

Fare Boxes
Cleveland Fare Box Co.
Johnson Fare Box Co.
Ohmer Fare Register Co.
Perey Mfg. Co.

Fare Registers
Elec. Service Supplies Co.
Johnson Fare Box Co.
Ohmer Fare Register Co.

Fences, Woven Wire and Fence Posts
Amer. Steel & Wire Co.

Fenders and Wheel Guards
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Fender Co.
St. Louis Car Co.
Star Brass Works
Wood Co., Chas. N.

Fibre and Fibre Tubing
Westinghouse E. & M. Co.

Field Coils (See Coils)

Floodlights
Elec. Service Supplies Co.
General Electric Co.

Floor, Soh
Haskelite Mfg. Corp.

Floors
Haskelite Mfg. Corp.

Forgings
Brill Co., The J. G.
Cincinnati Car Co.
Standard Steel Works Co.

Frogs & Crossings, Tee Rail
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Frogs, Track (See Track Work)

(Continued on page 50)

"The Standard for Rubber Insulation"

INSULATED WIRES and CABLES

"Okonite," "Manson," and Dundee "A" "B" Tapes

Send for Handbook

The Okonite Company

The Okonite-Callender Cable Company, Inc.

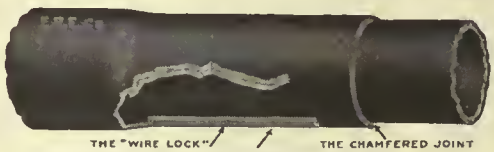
Factories, PASSAIC, N. J. PATERSON, N. J.

Sales Offices: New York Chicago Pittsburgh St. Louis Atlanta Birmingham San Francisco Los Angeles Seattle

Pettingell-Andrews Co., Boston, Mass.
F. D. Lawrence Electric Co., Cincinnati, O.
Novelty Electric Co., Phila., Pa.

Can. Rep.: Engineering Materials Limited, Montreal.
Cuban Rep.: Victor O. Mendoza Co., Havana.

ELRECO TUBULAR POLES



COMBINE

Lowest Cost Lightest Weight
Least Maintenance Greatest Adaptability

Catalog complete with engineering data sent on request.

ELECTRIC RAILWAY EQUIPMENT CO.
CINCINNATI, OHIO
New York City, 30 Church Street

The DIFFERENTIAL CAR



Standard on 60 Railways for

Track Maintenance
Track Construction
Ash Disposal
Coal Hauling
Concrete Materials
Waste Handling
Excavated Materials
Hauling Cross Ties
Snow Disposal

Use These Labor Savers

Differential Crane Car
Clark Concrete Breaker
Differential 3-way Auto Truck Body
Differential Car Wheel Truck and Tractor

THE DIFFERENTIAL STEEL CAR CO., Findlay, O.

AMELECTRIC PRODUCTS

BARE COPPER WIRE AND CABLE

TROLLEY WIRE

WEATHERPROOF WIRE AND CABLE

PAPER INSULATED UNDERGROUND CABLE

MAGNET WIRE

Reg. U. S. Pat. Office

AMERICAN ELECTRICAL WORKS
PHILLIPSDALE, R. I.

Chicago, 20-32 West Randolph Street.
Cincinnati, Traction Bldg.: New York, 100 E. 42nd St.

NAUGLE POLES
WESTERN & NORTHERN CEDAR
NAUGLE POLE & TIE CO.
59 E. MADISON ST. CHICAGO ILL.
New York · Columbus · Kansas City · Spokane · Vancouver · Boston

Chapman
Automatic Signals
Charles N. Wood Co., Boston



CREOSOTED

Railroad Cross-ties; Switch-ties; Bridge Timbers; Construction Timbers; Mine Timbers; Lumber; Piling; Poles; Posts and other Forest Products

J. F. Prettyman & Sons
Wood Preserving Plant
Charleston, S. C.

GOLD CAR HEATING & LIGHTING CO.
220 36th St., Brooklyn, N. Y.

ELECTRIC HEATERS WITH OPEN COIL OR ENCLOSED ELEMENTS
THERMOSTAT CONTROL—VENTILATORS
WRITE FOR NEW CATALOGUE

Repetition is Reputation

NACHOD & UNITED STATES SIGNAL CO. INC.
LOUISVILLE, KY.
BLOCK SIGNALS
FOR
ELECTRIC RAILWAYS
HIGHWAY CROSSING SIGNALS



Hubbard and COMPANY
PITTSBURGH CHICAGO

SAMSON SPOT WATERPROOFED TROLLEY CORD



Trade Mark Reg. U. S. Pat. Off.
Made of extra quality stock firmly braided and smoothly finished
Carefully inspected and guaranteed free from flaws.
Samples and information gladly sent.
SAMSON CORDAGE WORKS, BOSTON, MASS.

Frogs, Trolley
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Furnaces, Electric, Steel Melting
American Bridge Co.

Fuses and Fuse Boxes
Columbia Machine Works
Consolidated Car Heat. Co.
General Electric Co.
Westinghouse E. & M. Co.

Gaskets
Westinghouse Tr. Br. Co.

Gas-Electric Drive for Buses
General Electric Co.

Gas Producers
Westinghouse E. & M. Co.

Gasoline
Texas Company

Gates, Car
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.

Gear Blanks
Brill Co., The J. G.
Standard Steel Works Co.

Gear Cases
Chillingworth Mfg. Co.
Columbia Machine Works
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

Gears and Pinions
Bemis Car Truck Co.
Columbia Machine Works
Elec. Service Supplies Co.
General Electric Co.
Nat'l Ry. Appliance Co.

Generators
General Electric Co.
Westinghouse E. & M. Co.

Girder Rails
Bethlehem Steel Co.
Lorain Steel Co.

Gongs (See Bells and Gongs)

Greases (See Lubricants)
Texas Company

Grinders & Grinding Supplies
Railway Track-work Co.

Grinders, Portable Electric
Railway Track-work Co.

Grinders, Portable
Railway Track-work Co.

Grinding Bricks and Wheels
Railway Track-work Co.

Guard Rail Clamps
Ramapo Ajax Corp.

Guard Rails, Tee Rail and Manganese
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Guards, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.

Harps, Trolley
Columbia Machine Works
Elec. Service Supplies Co.
General Electric Co.
National Bearings Corp.
Nuttall Co., R. D.
Star Brass Works

Headlights
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

Headlining
Columbia Machine Works
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Heaters, Bus
Nichols-Lintern Co.

Heaters, Car (Electric)
Consolidated Car Heat. Co.
Gold Car Heat. & Ltg. Co.
Railway Utility Co.
Smith Heater Co., Peter

Heaters, Car, Hot Air and Water
Smith Heater Co., Peter

Heaters, Car, Stove
Smith Heater Co., Peter

Helmets, Welding
Railway Track-work Co.
Una Welding & Bonding Co.

Hoists and Lifts
Columbia Machine Works

Hose, Bridges
Ohio Brass Co.

Hose, Pneumatic
Westinghouse Tr. Br. Co.

Ice Cutters
Gifford-Wood Co., The

Instruments, Measuring, Testing and Recording
American Steel & Wire Co.
General Electric Co.
Westinghouse E. & M. Co.

Insulating Cloth, Paper and Tape
General Electric Co.
Irvington Varnish & Ins. Co.
Mica Insulator Co.
Okonite Co.
Okonite-Callender Cable Co. Inc.
Westinghouse E. & M. Co.

Insulating Machinery
Amer. Ins. Machinery Co.

Insulating Silk
Irvington Varnish & Ins. Co.

Insulating Varnishes
Irvington Varnish and Insulating Co.

Insulation (See also Paints)
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Mica Insulator Co.
Okonite Co.
Okonite-Callender Cable Co. Inc.
Westinghouse E. & M. Co.

Insulation Slot
Irvington Varnish & Ins. Co.

Insulator Pins
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Insulators (See also Line Materials)
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Interior Side Linings
Haskelite Mfg. Corp.

Interurban Cars (See Cars, Passenger, Freight, Express, etc.)

Jacks (See also Hoists and Lifts)
Columbia Machine Works
Elec. Service Supplies Co.

Journal Boxes
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.

Lamps, Guards and Fixtures
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Lamps, Arc & Incandescent (See also Headlights)
General Electric Co.
Westinghouse E. & M. Co.

Lamps, Signal and Marker
Elec. Service Supplies Co.
Nichols-Lintern Co.

Lanterns, Classification
Nichols-Lintern Co.

Letter Boards
Cincinnati Car Co.
Haskelite Mfg. Corp.

Lighting Fixtures, Interior
Electric Service Supplies Co.

Lightning Protection
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Line Material (See also Brackets, Insulators, Wires, etc.)
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
National Bearings Corp.
Ohio Brass Co.
Westinghouse E. & M. Co.

Locking Spring Boxes
Wm. Wharton, Jr. & Co.

Locomotives, Electric
Cincinnati Car Co.
Cummings Car & Coach Co.
General Electric Co.
Westinghouse E. & M. Co.

Lubricating Engineers
Universal Lubricating Co.

Lubricants, Oil and Grease
Texas Company
Universal Lubricating Co.

Lumber (See Poles, Ties, etc.)

Machinery, Insulating
American Insulating Machinery Co.

Manganese Parts
Bemis Car Truck Co.

Manganese Steel Guard Rails
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Manganese Steel, Special Track Work
Bethlehem Steel Co.
Wm. Wharton, Jr. & Co.

Manganese Steel Switches, Frogs & Crossings
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Mica
Mica Insulator Co.

Mirrors, Inside and Outside
Cincinnati Car Co.

Motors, Generators, & Controls for Gas Electric Buses
General Electric Co.

Motor Buses (See Buses)

Motorman's Seats
Brill Co., The J. G.
Cincinnati Car Co.
Elec. Service Supplies Co.
St. Louis Car Co.
Wood Co., Chas. N.

Motors, Electric
General Electric Co.
Westinghouse E. & M. Co.

Nuts and Bolts
Bemis Car Truck Co.
Cincinnati Car Co.
Hubbard & Co.

Oils (See Lubricants)
Texas Company

Oxyacetylene—See Cutting Apparatus

Oxygen
International Oxygen Co.

Packing
Westinghouse Tr. Brake Co.

Paints and Varnishes (Insulating)
Electric Service Supplies Co.
Irvington Varnish & Ins. Co.

Paints and Varnishes, Railway
Dixon Crucible Co.
Nat'l Ry. Appliance Co.

Pickups, Trolley Wire
Elec. Service Supplies Co.
Ohio Brass Co.

Pinion Pullers
Elec. Service Supplies Co.
Wood Co., Chas. N.

Pinions (See Gears)

Pins, Case Hardened, Wood and Iron
Bemis Car Truck Co.
Ohio Brass Co.
Westinghouse Tr. Brake Co.

Pipe Fittings
Standard Steel Works Co.
Westinghouse Tr. Brake Co.

Planers (See Machine Tools)

Plates for Tee Rail Switches
Ramapo Ajax Corp.

Pliers, Rubber Insulated
Elec. Service Sup. Co.

Plywood, Roofs, Headlinings, Floors, Interior Panels, Bulkheads, Truss Planks
Haskelite Mfg. Corp.

Pole Line Hardware
Bethlehem Steel Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.

Pole Reinforcing
Hubbard & Co.

Poles, Metal Street
Bates Expanded Street Truss Co.
Elec. Ry. Equipment Co.
Hubbard & Co.

Poles, Ties, Posts, Piling & Lumber
Bell Lumber Co.
International Creosoting Co.
Naugle Pole & Tie Co.
Prettyman & Sons, J. F.

Poles & Ties Treated
International Creosoting Co.
Bell Lumber Co.

Poles, Trolley
Elec. Service Supplies Co.
National Tube Co.
Nuttall Co., R. D.

Poles, Tubular Steel
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
National Tube Co.

Potheads
Okonite-Callender Cable Co., Okonite Co.

Power Houses
American Bridge Co.

Power Saving Devices
National Ry. Appliance Co.

Pressings, Special Steel
Cincinnati Car Co.

Pressure Regulators
General Electric Co.
Westinghouse E. & M. Co.
Westinghouse Tr. Brake Co.

Punches, Ticket
International Register Co.
Wood Co., Chas. N.

Rail Braces & Fastenings
Ramapo Ajax Corp.

Rail Grinders (See Grinders)

Rail Joints
Carnegie Steel Co.

Rail Joints, Welded
Lorain Steel Co.

Rail Welding
Railway Track-work Co.
Una Welding & Bonding Co.

Rails, Steel
Carnegie Steel Co.
Electric Equipment Co.

Railway Safety Switches
Consolidated Car Heat. Co.
Westinghouse E. & M. Co.

Railway Welding (See Welding Processes)

Rattan
Brill Co., The J. G.
Cummings Car & Coach Co.
Elec. Service Supplies Co.
Hale-Kilburn Co.
St. Louis Car Co.

Registers and Fittings
Brill Co., The J. G.
Cincinnati Car Co.
Elec. Service Supplies Co.
International Register Co.
Ohmer Fare Register Co.
St. Louis Car Co.

Reinforcement, Concrete
Amer. Steel & Wire Co.
Bethlehem Steel Co.
Carnegie Steel Co.

Repair Shop Appliances (See also Coil Banding and Winding Machines)
Elec. Service Supplies Co.

Repair Work (See also Coils)
Westinghouse E. & M. Co.

Replacers, Car
Cincinnati Car Co.
Elec. Service Supplies Co.

Resistance, Wire and Tube
Westinghouse E. & M. Co.

Resistances
Consolidated Car Heat. Co.
General Electric Co.

Retrievers, Trolley (See Catchers and Retrievers, Trolley)

Rheostats
General Electric Co.
Westinghouse E. & M. Co.

Roofing, Car
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Roofs, Car and Bus
Haskelite Mfg. Corp.

Sanders, Track
Brill Co., The J. G.
Elec. Service Supplies Co.
Nichols-Lintern Co.
Ohio Brass Co.
St. Louis Car Co.

Sash Fixtures, Car
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.

Sash Metal Car Window
Hale-Kilburn Co.

Scrapers, Track (See Cleaners and Scrapers, Track)

Screw Drivers, Rubber Insulated
Elec. Service Supplies Co.

Seating Materials
Brill Co., The J. G.
Haskelite Mfg. Corp.
Pantasote Co., Inc., The
St. Louis Car Co.

Seats, Bus
Brill Co., The J. G.
Hale-Kilburn Co.
St. Louis Car Co.

Seats, Car (See also Rattan)
Brill Co., The J. G.
Cincinnati Car Co.
Hale-Kilburn Co.
St. Louis Car Co.

Second Hand Equipment
Electric Equipment Co.
Hyman Michaels Co.

Shades, Vestibule
Brill Co., The J. G.
Cincinnati Car Co.

Shovels
Brill Co., The J. G.
Hubbard & Co.

Shovels, Power
Brill Co., The J. G.

Signals, Car Starting
Consolidated Car Heating Co.
Elec. Service Supplies Co.
National Pneumatic Co.

Signal Systems, Block
Elec. Service Supplies Co.
Nachod and U. S. Signal Co., Inc.
Union Switch & Signal Co.
Wood Co., Chas. N.

Signal Systems, Highway Crossing
Nachod and U. S. Signal Co., Inc.
Wood Co., Chas. N.

Slack Adjusters (See Brake Adjusters)

Sleet Wheels and Cutters
Anderson Mfg. Co., A. & J. M.
Cincinnati Car Co.
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
National Bearings Corp.
Nuttall Co., R. D.

Smokestacks, Car
Nichols-Lintern Co.

Snow-Plows, Sweepers and Brooms
Brill Co., The J. G.
Columbia Machine Works
Consolidated Car Fender Co.
Cummings Car & Coach Co.
St. Louis Car Co.

Soldering and Brazing (See Welding Processes and Apparatus)

Special Adhesive Papers
Irvington Varnish & Ins. Co.

Special Trackwork
Bethlehem Steel Co.
Lorain Steel Co., The
Wm. Wharton, Jr. & Co.

Spikes
Amer. Steel & Wire Co.

Splicing Compounds
Westinghouse E. & M. Co.

Splicing Sleeves (See Clamps and Connectors)

Springs, Car and Truck
American Steel & Wire Co.
American Steel Foundries
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
Standard Steel Works Co.

Sprinklers, Track and Road
Brill Co., The J. G.
Cummings Car & Coach Co.
St. Louis Car Co.

Steel and Steel Products
American Steel & Wire Co.
Carnegie Steel Co.

Steps, Car
Brill Co., The J. G.
Cincinnati Car Co.

Stokers, Mechanical
Babcock & Wilcox Co.
Westinghouse E. & M. Co.

Stop Signals
Nichols-Lintern Co.

Storage Batteries (See Batteries, Storage)

Strain, Insulators
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Strand
American Steel & Wire Co.
Roebling's Sons Co., J. A.

Street Cars, Passenger (See Cars, Passenger, Freight, Express, etc.)

Superheaters
Babcock & Wilcox Co.

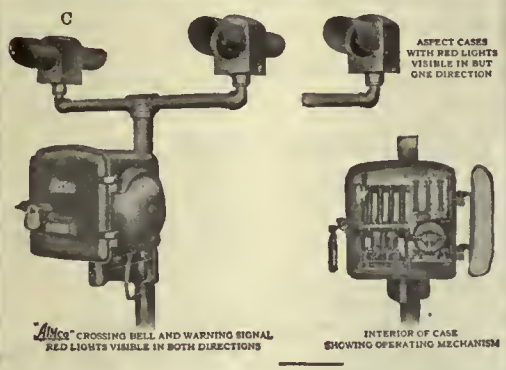
Sweepers, Snow (See Snow Plows, Sweepers and Brooms)

Switch Stands and Fixtures
Ramapo Ajax Corp.

Switches
General Electric Co.

Switches, Selector
Nichols-Lintern Co.

(Continued on page 52)



Send Today for our Publication on Safety and Efficiency in Electric Railway Signals and Crossing Bells

AMERICAN INSULATING MACHINERY CO., INC.
521 Huntingdon St., Philadelphia, Pa.



Don't Take Cars Out Of Service To Turn Worn Wheels

THE WHEEL TRUING BRAKE SHOE does the work while your car is in service. Don't jeopardize your schedules by excessive pull-ins owing to wheel troubles. Use Wheel Truing Brake Shoes and keep the maximum equipment in service. They save time, labor and money.

WHEEL TRUING BRAKE SHOE CO.
Detroit, Mich.



Kalamazoo Trolley Wheels

The value of Kalamazoo Trolley Wheels and Harps has been demonstrated by large and small electric railway systems for a period of thirty years. Being exclusive manufacturers, with no other lines to maintain, it is through the high quality of our product that we merit the large patronage we now enjoy. With the assurance that you pay no premium for quality we will appreciate your inquiries.



THE STAR BRASS WORKS
KALAMAZOO, MICH., U. S. A.

NORTHERN **BELL** WESTERN
CEDAR POLES
BUTT TREATING ALL GRADES TIES
BELL LUMBER CO., *Minneapolis, Minn.*

INDUSTRIAL GASES
ACETYLENE OXYGEN I.O.C. SYSTEM HYDROGEN NITROGEN
Quick shipment and low prices also on cylinders, valves, torches, regulators and supplies.
International Oxygen Co., Main Offices: Newark, N. J.
Branches: New York Pittsburgh Toledo

ANACONDA from mine to consumer
Rod, Wire and Cable Products
ANACONDA COPPER MINING COMPANY
THE AMERICAN BRASS COMPANY
General Offices - - 25 Broadway, New York
ANACONDA TROLLEY WIRE

ELECTRICAL WIRES and CABLES
ROEBLING
John A. Roebling's Sons Co., Trenton, N.J.

Efficient Bus Heating
with
The N-L Venti-Duct Heater
THE NICHOLS-LINTERN CO.
7960 Lorain Ave. Cleveland, Ohio

H B LIFE GUARDS
PROVIDENCE FENDERS
Manufactured by
CONSOLIDATED CAR FENDER CO., PROVIDENCE, R. I.
General Sales Agents
WENDELL & MacDUFFIE CO., 110 E. 42nd St., N. Y. C.



CHILLINGWORTH
One-Piece Gear Cases
Seamless—Rivetless—Light Weight
Best for Service — Durability and Economy. *Write Us.*
Chillingworth Mfg. Co.
Jersey City, N. J.



STUCKI SIDE BEARINGS
A. STUCKI CO.
Oliver Bldg.
Pittsburgh, Pa.

EIGHT WORKS
RAMAPO-AJAX-ELLIOT
HILLBURN, NEW YORK
NIAGARA FALLS, N.Y.
CHICAGO, ILLINOIS
EAST ST. LOUIS, ILL.
PUEBLO, COLORADO
SUPERIOR, WISCONSIN
LOS ANGELES, CAL.
NIAGARA FALLS, ONT. CANADA

Ramapo Ajax Corporation
RACOR
RAMAPO AUTOMATIC RETURN SWITCH STANDS FOR PASSING SIDINGS
TEE RAIL SPECIAL WORK
MANGANESE WORK A SPECIALTY
SALES OFFICES AT ALL WORKS
Main Office, HILLBURN, N.Y.

WHAT AND WHERE TO BUY—Continued from page 50

Switches and Switchboards
Consolidated Car Heating Co.
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

Switches, Tee Rail
Ramapo Ajax Corp.

Switches, Track (See Track Special Work)

Tampers, Tie
Railway Track-work Co.

Tapes and Cloths (See Insulating Cloth, Paper and Tape)

Tee Rail Special Track Work
Ramapo Ajax Corp.

Telephone and Telegraph Wire
American Steel & Wire Co.
J. A. Roebling's Sons Co.

Telephones and Parts
Elec. Service Supplies Co.

Testing Instruments (See Instruments, Electrical Measuring, Testing, etc.)

Thermostats
Consolidated Car Heating Co.
Gold Car Heat. & Ltg. Co.
Railway Utility Co.
Smith Heater Co., Peter

Ticket Choppers and Destroyers
Elec. Service Supplies Co.

Ties, Mechanical
Dayton Mechanical Tie Co.

Ties and Tie Rods, Steel
American Bridge Co.
Carnegie Steel Co.
International Steel Tie Co.

Ties, Wood Cross (See Poles, Ties, Posts, etc.)

Tires
Firestone Tire & Rubber Co.
Goodrich Tire & Rubber Co.

Tongue Switches
Wm. Wharton, Jr. & Co.

Tools, Track & Miscellaneous
Amer. Steel & Wire Co.
Columbia Machine Works
Elec. Service Supplies Co.
Hubbard & Co.
Railway Track-work Co.

Towers and Transmission Structures
Bates Expanded Steel Truss Co.
Westinghouse E. & M. Co.

Track Grinders
Railway Track-work Co.
Ramapo Ajax Corp

Track, Special Work
Columbia Machine Works
Ramapo Ajax Corp.

Trackless Trolley Cars
Brill Co., The J. G.
St. Louis Car Co.

Transfer Issuing Machines
Ohmer Fare Register Co.

Transfer Tables
American Bridge Co.

Transformers
General Electric Co.
Westinghouse E. & M. Co.

Transmission Towers & Structures
American Bridge Co.

Treads, Safety Stair Car Steps
Cincinnati Car Co.

Tree Wire
Okonite Callender Cable Co.
Okonite Co.

Trolley Bases
Ohio Brass Co.
National Bearings Corp.
Nuttall Co., R. D.
Westinghouse E. & M. Co.

Trolley Bases, Retrieving
Nuttall Co., R. D.

Trolley Buses
Brill Co., The J. G.
General Electric Co.

Trolley Material, Overhead
Anderson Mfg. Co..
A. & J. M.
Elec. Service Supplies Co.
General Electric Co.
National Bearings Corp.
Ohio Brass Co.
Westinghouse E. & M. Co.

Trolley Wheels (See Wheels, Trolley)

Trolley Wheel Bushings
National Bearings Corp.
Star Brass Works

Trolley Wire
American Brass Co.
Amer Electrical Works
Amer. Steel & Wire Co.
Anaconda Copper Min. Co.
Roebling's Sons Co., J. A.

Trucks, Car
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Cummings Car & Coach Co.
St. Louis Car Co.

Truss Planks
Haskelite Mfg. Corp.
National Tube Co.

Tubing, Yellow & Black Flexible Varnishes
Irvington Varnish & Ins. Co.

Turbines, Steam
General Electric Co.
Westinghouse E. & M. Co.

Turnstiles
Elec. Service Supplies Co.
Perey Mfg. Co., Inc.

Turntables
Elec. Service Supplies Co.
American Bridge Co.

Valves
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Varnished Papers & Silks
Irvington Varnish & Ins. Co.

Varnishes (See Paints, etc.)

Ventilators
National Ry. Appliance Co.
St. Louis Car Co.

Ventilators, Car
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Heating Co.
Nichols-Lintern Co.
Railway Utility Co.

Vestibule Linings
Haskelite Mfg. Corp.

Welded Rail Joints
Lorain Steel Co.
Railway Trackwork Co.
Una Welding & Bonding Co.

Welders, Portable Electric
General Electric Co.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Welders, Rail Joint
General Electric Co.
Ohio Brass Co.
Railway Track-work Co.

Welding & Cutting Tools
International Oxygen Co.

Welding Processes and Apparatus
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Welding Steel
Railway Track-work Co.
Una Welding & Bonding Co.

Welding Wire
American Steel & Wire Co.
Railway Track-work Co.
Roebling's Sons Co., J. A.

Welding Wire and Rods
Railway Track-work Co.

Wheels, Car, Cast Iron
Ass'n of Mfrs. of Chilled Car Wheels
Griffin Wheel Co.

Wheels, Car, Steel & Steel Tired
American Steel Foundries
Bemis Car Truck Co.
Carnegie Steel Co.
Standard Steel Works Co.

Wheels, Motor
Motor Wheel Corp.

Wheels, Trolley
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
National Bearings Corp.
Nuttall Co., R. D.
Star Brass Works

Wheels, Wrought Steel
Carnegie Steel Co.

Wheel Guards (See Fenders and Wheel Guards)

Wheel Grinders
Wheel Truing Brake Shoe Co.

Wheel Presses (See Machine Tools)

Whistles, Air
Ohio Brass Co.
Westinghouse E. & M. Co.
Westinghouse Traction Brake Co.

Window Guards and Fittings
Cincinnati Car Co.

Wire Rope
American Steel & Wire Co.
Roebling's Sons Co., J. A.

Wires and Cables
American Brass Co., The
Amer. Electrical Works
Amer. Steel & Wire Co.
Anaconda Copper Mining Co.
Kerite Ins. Wire & Cable Co.
Okonite Co.
Okonite-Callender Cable Co., Inc.
Roebling's Sons Co., J. A.
Westinghouse E. & M. Co.

ALPHABETICAL INDEX TO ADVERTISEMENTS

	Page
American Appraisal Co., The	46
American Brass Co., The	51
American Bridge Co	46
American Car Co	53
American Electrical Works	49
American Insulating Machinery Co.	51
American Steel & Wire Co	31
American Steel Foundries	8
Anaconda Copper Mining Co	51
Anderson Mfg. Co., A. & J. M.	38
Asso. of Mfrs. Chilled Car Wheels	30
Babcock & Wilcox Co	45
Bates Expanded Steel Truss Co.	45
Beeler Organization	44
Bell Lumber Co	51
Bemis Car Truck Co	28
Bethlehem Steel Company	46
Bibbins, J. Rowland	44
Brill Co., The J. G	53
Buchanan & Layng Corp	45
Carnegie Steel Co	33
Chillingworth Mfg. Co	51
Cincinnati Car Co	14-15
Cleveland Fare Box Co	46
Collier, Inc., Barron G	39
Columbia Machine Works & M. I. Co.	42
Consolidated Car Fender Co	51
Consolidated Car Heating Co	51
Cummings Car & Coach Co	10
Day & Zimmermann, Inc.	44
Dayton Mechanical Tie Co.	Insert 11-12
Differential Steel Car Co., The	46
Drum & Co., A. L	45
Earll, C. L	38
Electric Equipment Co	47
Electric Ry. Equipment Co	49
Electric Service Supplies Co	9
Faile & Co., E. H	44
Firestone Tire & Rubber Co	27
Ford, Bacon & Davis	44
"For Sale" Ads	47
General Electric Co.	20, Back Cover
Gifford-Wood Co	43
Goodrich Rubber Co., The B. F.	25
Gold Car Heating & Ltg. Co	49
Griffin Wheel Co	40
Hale-Kilburn Co	24
Haskelite Mfg. Corp	52
"Help Wanted" Ads	47
Hemphill & Wells	44
Holst Englehardt W	44
Hubbard & Co	49
Hyman-Michaels Co.	47
International Creosoting Co	35
International Oxygen Co	51
International Register Co	43
International Steel Tie Co., The	7
Irvington Varnish & Insulator Co.	45
Jackson, Walter	44
Jeandron, W. J	40
Johnson Fare Box Co	42
Kelker, DeLeuw & Co	44
Kerite Ins. Wire & Cable Co	42
Kuhlman Car Co	53
LeCarbone Co	40
Linn & Marshall, Inc	44
Lorain Steel Co	46
McClellan & Junkersfeld	44
McGovern, Halsey	45
Mica Insulator Co	43
Morganite Brush Co., Inc	41
Motor Wheel Corp	Front Cover
Nachod and United States Signal Co., Inc.	49
National Bearing Metals Corp	40
National Brake Co	23
National Pneumatic Co	15
National Ry. Appliance Co	46
National Tube Co	32
Naugle Pole & Tie Co	49
Nichols-Lintern Co., The	51
Nuttall Co., R. D	38
Oakite Products, Inc	42
Ohio Brass Co	5-6
Ohmer Fare Register Co	41
Okonite-Callendar Cable Co., Inc. The	49
Okonite Co., The	49
Pantasote Co., The	40
Perey Mfg. Co., Inc	45
Portland Cement Asso	37
Positions Wanted and Vacant	47
Prettyman & Sons, J. F	49
Railway Track-work Co	4
Railway Utility Co	52
Ramapo Ajax Corp	51
Richey, Albert S	44
Roebling's Sons Co., John A	51
Russell, Burdsall & Ward Bolt & Nut Co.	36
St. Louis Car Co	18-19
Samson Cordage Works	49
Sanderson & Porter	44
Searchlight Section	47
Smith Heater Co., Peter	45
Standard Steel Works Co	29
Star Brass Works, The	51
Steubenville, East Liverpool & Beaver Valley Traction Co.	47
Stevens & Wood, Inc	44
Stone & Webster	44
Stucki Co., A	51
Texas Co., The	24
Una Welding & Bonding Co	45
Union Switch & Signal Co	16
Universal Lubricating Co., The	45
Virginia Public Service Co	47
"Want" Ads	47
Wason Mfg. Co	53
Westinghouse Elec. & Mfg. Co	2
Westinghouse Traction Brake Co.	17
Wharton, Wm., Jr. & Co., Inc.	46
"What and Where to Buy."	48-50-52
Wheel Truing Brake Shoe Co	51
White Eng. Corp., The J. G	44
Wish Service, The P. Edw	45
Wood Co., Chas. N	49
Yellow Truck & Coach Co.,	Insert 11-12-13-14

RAILWAY UTILITY COMPANY
CAR COMFORT WITH HEATERS
UTILITY REGULATORS
VENTILATORS
2241-2247 Indiana St. Chicago, Ill.
Write for Catalogue
1328 Broadway New York, N. Y.

HASKELITE ROOFS
Haskelite Manufacturing Corporation,
133 West Washington Street, Chicago
PLYMETL SIDE PANELS



Absolute SAFETY

Design and equipment of Brill 1928 Model Car forecast safer operation

The full vision windshield at each end gives the operator an unobstructed view at all times, thus assisting him in evading collisions with both vehicular and pedestrian traffic; the unusually low car body minimizes danger to both boarding and alighting passengers; complete automatic safety control devices guarantee a safe stop when the human element fails; with passengers entering at front and leaving at rear, and thereby constituting a circulating load, the dangers of passengers' injury inside the car are reduced; interlocking the control of the rear treadle door operation with the brakes, making it impossible to open the doors while the car is in motion or start with the doors open, also safeguards the public from injury.

Then again, equipped with drum type external contracting brakes arranged for equally positive operation regardless of passenger load, the Brill 1928 Model Electric Car measures up to the highest standard in passenger safety.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.
AMERICAN CAR CO. ST. LOUIS, MO. — G. C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.

BRILL 1928 Model Electric Car



Grand Rapids, too, uses G-E Compressors

The 27 new rail coaches at Grand Rapids, the acme of all that is excellent in modern mass transportation, are making this property conspicuously successful. These cars are equipped with General Electric CP-27 Compressors.

Amply proportioned bearings and motor parts and an ideal system of lubrication are among the features responsible for the exceptionally fine service records which G-E compressors are making on hundreds of properties.

You can secure complete information from your G-E sales office.

General Electric equipment has been chosen for numerous recent outstanding car developments. It has helped to make many of those low-cost operating records which are proving so conclusively the value of the modern light-weight car.

330-31

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN PRINCIPAL CITIES

ELECTRIC RAILWAY JOURNAL

cGraw-Hill Publishing Company, Inc. DECEMBER 10, 1927 Twenty Cents per Copy

HOUSTON PUBLIC LIBRARY,
HOUSTON, TEXAS.

2 Men Push 80 Tons



A modern railroad sleeper weighs eighty tons. Two men readily push it, because there are Timken Tapered Roller Bearings in the journals.

That dramatizes the conquest of friction, which gives you jerkless, bumpless, swayless travel, and saves the railroads fuel, lubricant and heavy depreciation charges.

In this field, as throughout Industry, Timken Tapered Roller Bearings prevail because it takes more than the best friction-elimination to eliminate wear. Only Timken Tapered Roller Bearings provide the supreme endurance of Timken tapered construction, Timken-made electric steel, and Timken *POSITIVELY ALIGNED ROLLS.*

THE TIMKEN ROLLER BEARING CO., CANTON, OHIO

TIMKEN Tapered Roller BEARINGS

A WESTINGHOUSE-NUTTALL DEVELOPMENT

An outstanding contribution to modern passenger car design



W-N Drive for use with light-weight high-speed motors

—Heat-treated hardened helical gears—

—Timken roller bearings—

—Oil-tight steel gear case—

—High ratio of speed reduction—

Here is an equipment which has already attracted wide and favorable interest. The industry has been quick to sense its advantages—smoother starting, quiet operation, rapid acceleration and greater all-round efficiency.

MEMBER AERA 1927

R.D. NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

All Westinghouse Electric & Mfg. Co. district offices are sales representatives for Nuttall Railway Products.

Canadian Agents:
Lyman Tube & Supply Co., Montreal

Nuttall

MORRIS BUCK
Managing Editor
JOHN A. MILLER, Jr.
Associate Editor
CLARENCE W. SQUIER
Associate Editor
CARL W. STOCKS
Associate Editor

ELECTRIC RAILWAY JOURNAL

CHARLES GORDON, *Editor*

HENRY W. BLAKE
Senior Editor
GEORGE J. MacMURRAY
News Editor
G. W. JAMES, Jr.
Assistant Editor
PAUL WOOTON
Washington Correspondent
ALEX McCALLUM
Editorial Representative
London, England

Vol. 70
No. 24

CONTENTS

Pages
1049-1088

DECEMBER 10, 1927

Editorials 1049

Capitalizing the Coffin Award 1052
All Grand Rapids knew in advance of the Coffin award and its significance, because of a careful plan of advertising. When the medal was won enthusiasm became universal and citizens joined the railroad in acclaiming the victory.

De Luxe Trend Shown in the New Brill Car 1055
The 1928 model, as it is called, has graceful lines, sloping front end, motors spring mounted crosswise of trucks using Nuttall speed reducing units with helical gears.

San Francisco Purchase Urged 1059
Delos F. Wilcox recommends to city that it take over railway properties as the franchises expire. Offer of $1,000,000 for California Street Railway and $20,000,000 for Market Street Railway suggested.

W., B. & A. Electric Railroad Conducts Prize Quiz .. 1061
By H. T. CONNOLLY.

Fares and Fare Collection in Europe 1062
By HENRY W. BLAKE.
Some lines charge zone fares, others flat fares. The fare receipt is common, but fare boxes are used on one-man cars. London County Council is pioneering in mid-day fare reductions.

Operator's Nameplate Put on Fare Box 1069

Maintenance Methods and Devices 1070
Good Use Found for Obsolete Cars 1070
Auxiliary Light for Block Signal 1070
Ball-Bearing Adjustable Armature Stand 1070
Handling Compressors Pneumatically 1070

New Equipment Available 1071
Improved Type of Slack Adjuster 1071
Spun-Geared Chain Hoist 1071
High-Speed, Heavy-Duty Metal Saw 1071
Long Life Feature of New Hoists 1072
Thin Wrench for Brake Adjustment 1072

Association Activities 1073

American Association News 1073

News of the Industry 1075

Recent Bus Developments 1080

Financial and Corporate 1083

Book Reviews 1084

Personal Mention 1085

Manufactures and the Markets 1087

Completing the Record

COMPLETE files of ELECTRIC RAILWAY JOURNAL and its predecessor, STREET RAILWAY JOURNAL, are exceedingly rare. The New York Public Library has so far been unsuccessful in obtaining a set dating back to the beginning of publication in 1884. Elsewhere in this issue is an appeal to the readers for help in getting the missing volumes. We hope it will be possible to meet it and fill the vacant spaces on the shelves.

The New York Public Library has become more than a mere city library. With its 2,847,275 books and printed pamphlets its size is exceeded in the Western Hemisphere only by the Library of Congress at Washington. It is a great public institution that is building for the future. It wants posterity to have a complete record of the industrial growth of this country. Bulking large in that growth is city transportation, the story of which is recorded week by week in the pages of the JOURNAL. Nothing could better illustrate the dependence that is placed on this paper and on the house of McGraw-Hill by this request.

McGRAW-HILL PUBLISHING COMPANY, INC.
Tenth Avenue at 36th Street, New York, N. Y.
New York District Office, 285 Madison Ave.

JAMES H. McGRAW, President
JAMES H. McGRAW, Jr., V.-P. and Treas.
MALCOLM MUIR, Vice-President
EDWARD J. MEHREN, Vice-President
MASON BRITTON, Vice-President
EDGAR KOBAK, Vice-President
C. H. THOMPSON, Secretary

WASHINGTON:
National Press Building
CHICAGO:
7 S. Dearborn Street
PHILADELPHIA:
1600 Arch St.
CLEVELAND:
Guardian Building
ST. LOUIS:
Bell Telephone Building
SAN FRANCISCO:
883 Mission Street
LONDON:
6 Bouverie Street, London, E. C. 4

Member Associated Business Papers, Inc.
Member Audit Bureau of Circulations

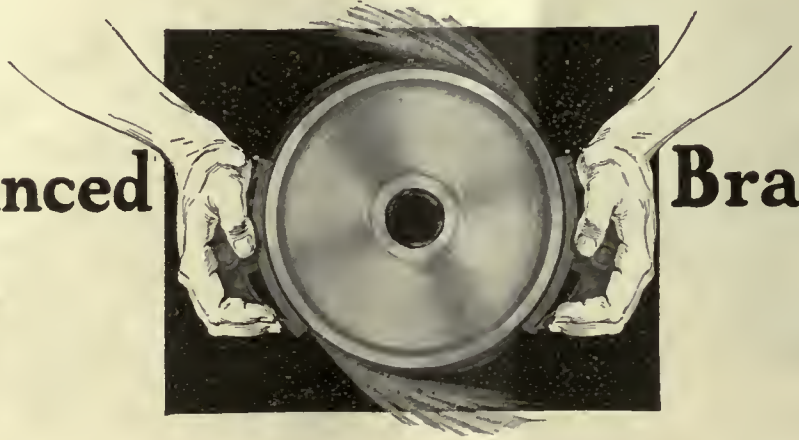
Cable Address: "Machinist, N. Y."

Publishers of
Engineering News-Record
American Machinist
Power
Chemical and Metallurgical Engineering
Coal Age
Coal Age News
Engineering and Mining Journal
Ingeniería Internacional
Bus Transportation
Electrical Railway Journal
Electrical World
Industrial Engineering
Electrical Merchandising
Radio Retailing
Construction Methods
Electrical West
(Published in San Francisco)
American Machinist—European Edition
(Published in London)

The annual subscription rate is $4 in the United States, Canada, Mexico, Alaska, Hawaii, Philippines, Porto Rico, Canal Zone, Honduras, Cuba, Nicaragua, Peru, Colombia, Bolivia, Dominican Republic, Panama, El Salvador, Argentina, Brazil, Spain, Uruguay, Costa Rica, Ecuador, Guatemala, Chile and Paraguay. Extra foreign postage to other countries $3 (total 27 or 28 shillings). Subscriptions may be sent to the New York office or to the London office. Single copies, postage prepaid to any part of the world, 20 cents.

Change of Address—When change of address is ordered the new and the old address must be given, notice to be received at least ten days before the change takes place.
Copyright, 1927, by McGraw-Hill Publishing Company, Inc.
Published weekly. Entered as second-class matter, June 23, 1896, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Printed in U. S. A.

Balanced Braking



Double the Braking Area—

Double it—and you decrease over 50% the required energy absorption per brake shoe.

Double the braking area and you greatly increase the friction coefficient.

Double it and you can attain a higher rate of retardation.

Double it and you decrease the frequency of brake shoe replacements.

The "SIMPLEX AND AMERICAN MULTIPLE UNIT" clasp brakes with two brake shoes per wheel instead of one, doubles the braking area and accomplishes these results.

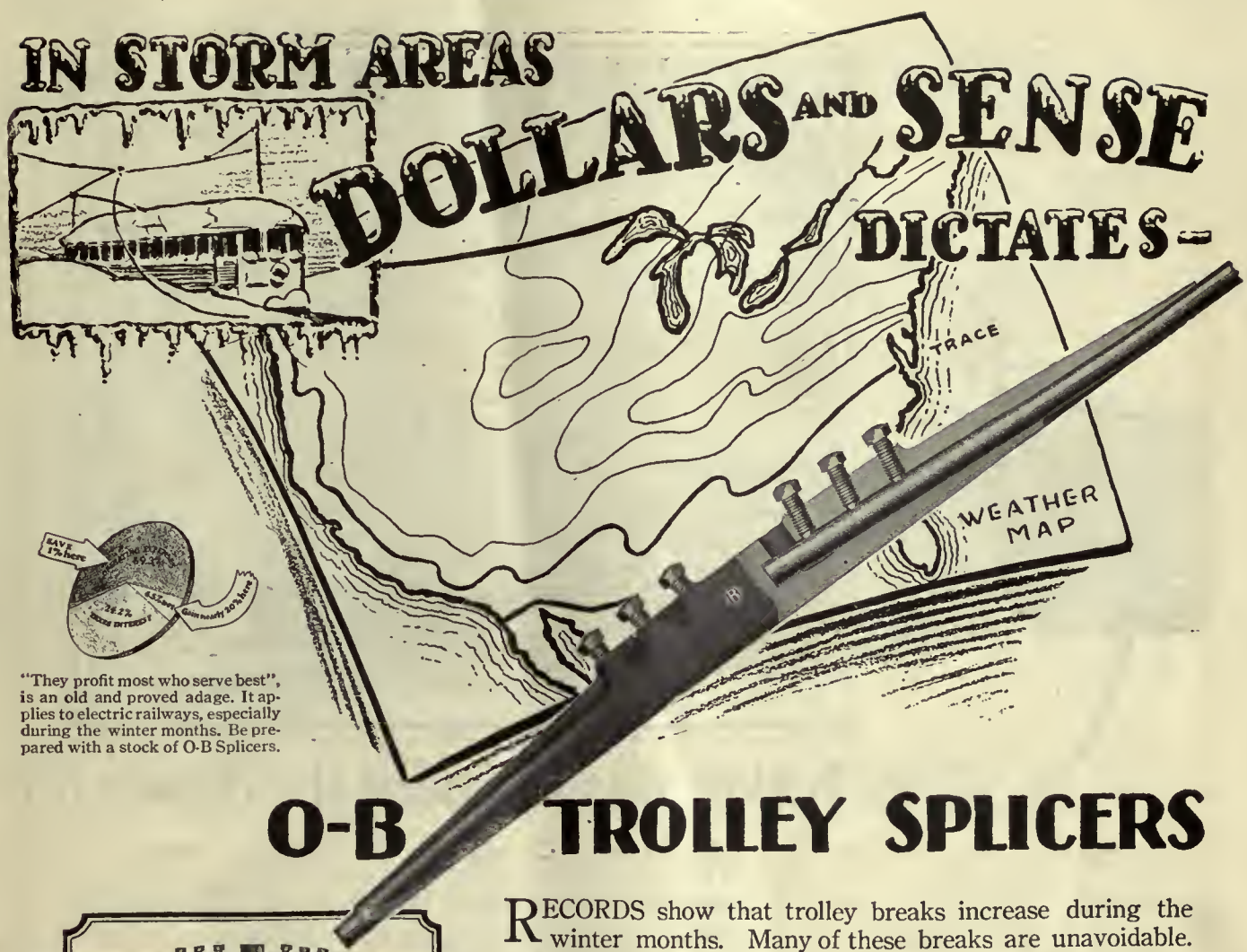
AMERICAN STEEL FOUNDRIES

NEW YORK CHICAGO ST. LOUIS

American Multiple Unit Clasp Brake



IN STORM AREAS DOLLARS AND SENSE DICTATES—



"They profit most who serve best", is an old and proved adage. It applies to electric railways, especially during the winter months. Be prepared with a stock of O-B Splicers.

O-B TROLLEY SPLICERS

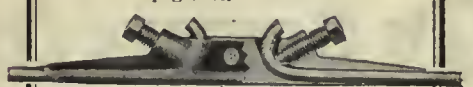
THE Type "C" Splicing Ear has all the qualities of the "C" Splicer. In addition it has a boss for suspension at the span or bracket arm. Cat. page 543.



TYPE "D" Trolley Wire Splicer combines great strength and long life with good clearance for the trolley wheel. Used especially on heavy city or interurban lines. Cat. Page 546.



TYPE "D" Splicing Ear is similar to the "D" Splicer but is provided with a central boss for attachment to span or bracket arm. Cat. page. 546.



THE Improved Clark Splicer is substantially designed but has not all the advantages of the Type "C" Splicer. Used where low first cost is the chief consideration. Cat. page 549.

RECORDS show that trolley breaks increase during the winter months. Many of these breaks are unavoidable. But car riders don't know it—and care less. They do know that "when winter comes" they depend most on electric railways for fast, reliable and safe transportation. Therefore, in spite of trolley breaks, good service demands quick, *permanent* repairs—the minimum interference with car schedules.

When you use O-B Splicers, service need not be tied up for any length of time because of wire breaks. Nor need breaks ever occur twice in the same place. For O-B Splicers go into place quickly and stay there.

Design and workmanship provide an improved underrun that gives virtually the effect of a continuous trolley wire. There are no shoulders or saw cuts at the point where splicer lips and body merge. There is therefore less danger of wire crystallization at this point, due to excessive pounding of the trolley wheel, and less risk of a trolley break within the splicer.

These and other reasons, explained in Folder 150-B (sent on request), suggest that you specify O-B Splicers on your next order. For quick action, write or wire.

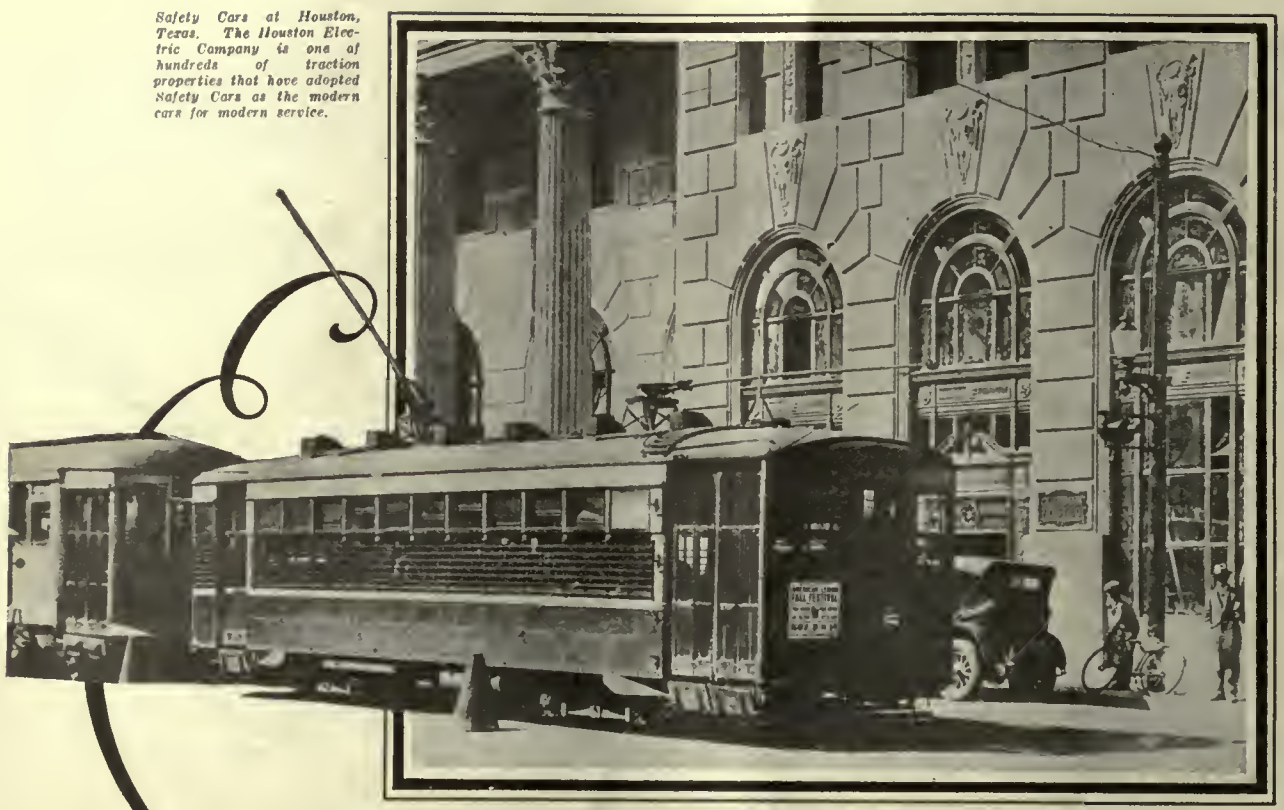
Ohio Brass Company, Mansfield, Ohio
Dominion Insulator & Mfg. Co., Limited
Niagara Falls, Canada
7368

Ohio Brass Co.

PORCELAIN INSULATORS
LINE MATERIALS
RAIL BONDS
CAR EQUIPMENT
MINING MATERIALS
VALVES

SALES OFFICES: NEW YORK CHICAGO PHILADELPHIA PITTSBURGH CLEVELAND SAN FRANCISCO LOS ANGELES

Safety Cars at Houston, Texas. The Houston Electric Company is one of hundreds of traction properties that have adopted Safety Cars as the modern cars for modern service.



Evolution has brought the *Safety Car*

WITH transportation progress has come the Safety Car. Progressive traction properties, quick to realize the intrinsic worth of Safety Car Control, adopted it—thus establishing the trend that has led to nation-wide acceptance of the Safety Car—the modern car.

Now firmly established as the standard on hundreds of properties, Safety Cars are consistently proving a stimulus to modern traction service. With their adoption has come a more frequent service, better schedule speeds have been maintained and the reaction of the riding public has invariably voiced itself in the form of increased patronage. Inasmuch as increased patronage means greater revenue, Safety Car adoption is natural.

Detailed information relative to the intrinsic value of the Safety Car may be obtained from any of our conveniently located offices. This service is maintained exclusively for the use of the operator and is in no way obligatory.



SAFETY CAR DEVICES CO.
OF ST. LOUIS, MO.

Postal and Telegraphic Address:
WILMERDING, PA.

CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH

3121

Interlocking the power and brakes by means of special controller handle provides safeguard against operator's inattention or disability.



In the "Good Old Days"

and To-day:

Back in what may be called the "dark ages" of transportation it was a hopeless proposition to try to peruse even the headlines. Anyone with poor eyesight couldn't read at all and those that started with good eyes ended up at the oculists.

It's quite different today with cars equipped with Dome Type Lighting Fixtures. The well diffused light makes it easy for everyone to read every word—without a bit of strain on the eyes.

And a well lighted car is a ride-seller—because it's bright, cheerful and attractive.

Ask for the full details of our complete line of ride-selling equipment — Keystone Car Equipment as described in Catalog No. 7.



Safety Dome Type Lighting Fixtures

These fixtures, made in various styles, represent the very latest and most approved designs. They are made to withstand extreme vibration, provide efficient lighting and greatly add to the attractiveness of cars. Due to the lesser number of units required important savings are realized.

Home office and plant at 17th & Cambria Sts., PHILADELPHIA; District offices at 230 So. Clark St., CHICAGO; 50 Church St., NEW YORK; Bessemer Bldg., Pittsburgh; 88 Broad St., Boston; General Motors Bldg., Detroit; 316 N. Washington Ave., Scranton; Canadian Agents, Lyman Tube & Supply Company, Ltd., Montreal, Toronto, Vancouver.

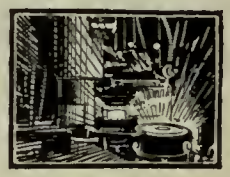
ELECTRIC SERVICE SUPPLIES CO.

MANUFACTURER OF RAILWAY, POWER AND INDUSTRIAL ELECTRICAL MATERIAL

Gary wrought steel wheels combine the benefits of



rolling with the advantages of forging



Mileage is rolled into them and trouble forged out

for uninterrupted economical and trouble free service

Specify Gary wrought steel wheels

Illinois Steel Company

General Offices: 208 South La Salle Street ··· Chicago, Illinois

LAST WEEK

A president purchased cars!



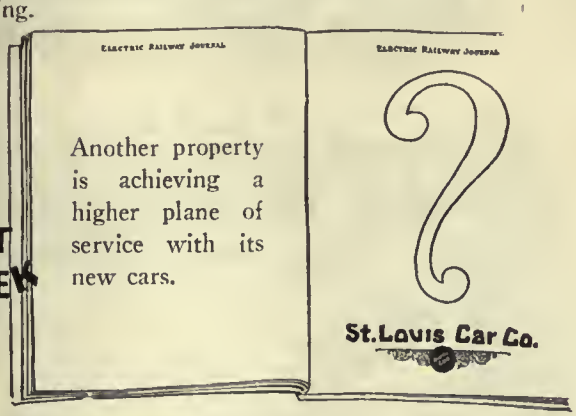
THIS WEEK

Men who sit in high places are of one opinion—that the turning point in the electric railway industry has been reached and *passed!*

But problems still face us all. And not the least of these is that of winning a growing volume of business from other methods of transportation. We have a high present-day standard to compete with. We must balance improvement against the revenue necessary to make our properties self-supporting.

So we're not done yet and won't be until all presidents, vice-president, superintendents, the public rank and file from the mayor to the newsboy attain a sixth sense—an unconscious recognition of the electric railway as their personal preference in economical, comfortable transportation.

But that time is coming for .... NEXT WEEK



St.Louis Car Co.

Quality Cars



Fageol Twin Coach of the Pittsburgh Motor Coach Company. The Twin Coach as well as many other modern coaches is furnished with the Westinghouse Automotive Air Brake, as standard equipment.

More Air Braked Coaches for Pittsburgh

PERHAPS in no other city are coach operating conditions more severe. Heavy traffic congestion, long hard hills, and unusual competition for the right of way have made the Air Brake a necessity.

The Westinghouse Air Brake is not new to Pittsburgh. For the past several years, the Pittsburgh Motor Coach Company has operated various makes of motor vehicles, including White, Fageol, Safeway, and by recent delivery several Fageol Twin Coaches, also Westinghouse Automotive Air Brake equipped. With this array of equipment, under modern brake control, the Pittsburgh Motor Coach Company has been able to set and maintain perfect schedules in spite of the conditions under which they serve.

This is just one instance in which the Westinghouse Air Brake has played an auspicious part . . . A representative from any of our conveniently located offices will be glad to tell you of others and go over your braking problems with you . . . without obligation of course.

Hold your place in traffic lanes, get the benefits of your full speed and power, relieve drivers from undue physical exertion, protect your equipment from strain caused by unequal applications . . . modernize with the Westinghouse Automotive Air Brake.

WESTINGHOUSE TRACTION BRAKE COMPANY
Automotive Brake Division: WILMERDING, PENNA.

6204

WESTINGHOUSE
AUTOMOTIVE AIR BRAKES

STYLES IN TRACK CONSTRUCTION

1

This is No. 1 of a series on paved track design with STEEL TWIN TIES as used in over 45% of the cities of over 200,000 population in the United States. No. 2 will appear in an early issue.

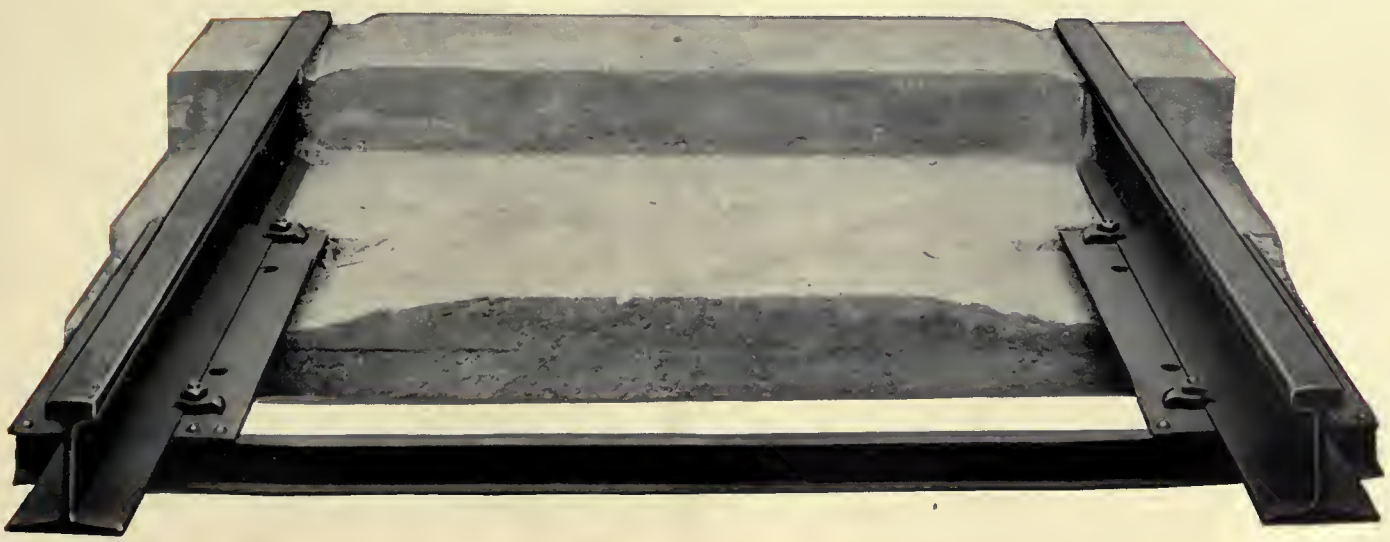
CINCINNATI



TODAY

YESTERDAY

No. 1 Cincinnati
No. 2 Boston
No. 3 Detroit
No. 4 Philadelphia
No. 5 Kansas City
No. 6 Cleveland
No. 7 Washington
No. 8 Buffalo



STEEL TWIN TIE TRACK

THE BASE OF MODERNIZATION

In Cincinnati



STEEL TWIN TIES are used in Cincinnati with rail section 93-507. The ends are bent upward to cant the rails one in twenty-five and the rail joints are thermit welded. The paving, which is installed by the City, is concrete, laid in a second course following completion of the track structure.

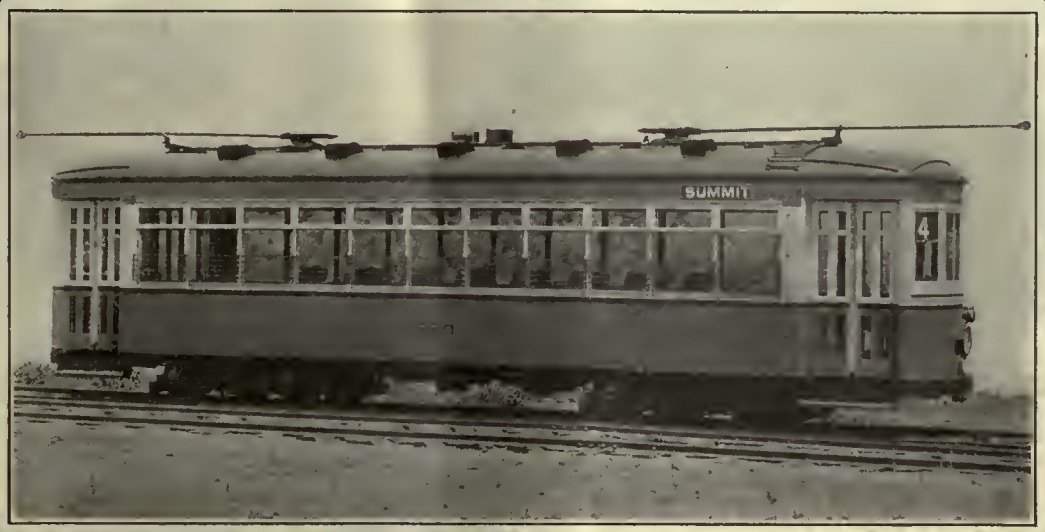
Complete detailed drawings and specifications of the Cincinnati design will be sent on request.

Engineers of The International Steel Tie Company have played no small part in the design of better, more lasting track. We have in our files a fund of data on paved track construction that is at your disposal. We will be pleased to discuss with you your paved track problems, and to help you start your modernization program right. Steel Twin Ties are the first step toward better service, and lower initial and maintenance costs.

The International Steel Tie Co.
Cleveland, Ohio

TWIN TIES ARE ALL STEEL

Massachusetts



NP

Worcester Takes the Word of Other Cities

Worcester, Mass., is another of the cities where the NP Treadle Door is *new*. The operators, however, have seen treadle door results obtained in many other cities. Their confidence in treadle doors is shown by the installation of 100 treadles in 50 new cars.

NATIONAL PNEUMATIC COMPANY

Executive Office: Graybar Building, New York

General Works: Rahway, New Jersey

CHICAGO
518 McCormick Building

MANUFACTURED IN TORONTO, CANADA, BY
Railway & Power Engineering Corp., Ltd.

PHILADELPHIA
1010 Colonial Trust Building



for

MODERN CAR UPHOLSTERY *you can't do better than* PLUSH

—and—
it's so easy to clean

It takes but a few minutes to make car upholstery—if it's Massachusetts Mohair Plush—look like new! No matter how dusty the plush may be, the original new lustre is easily restored. No other upholstery material is more sanitary than plush!

Furthermore, the newest patterns and colorings provide all that could be desired in luxurious practical upholstery for every type of service.

Passengers riding on Massachusetts Mohair Plush are supported on myriads of little springs—the utmost in ease and luxury.

Specify plush in your next order. Let us send you quotations and samples *now*.

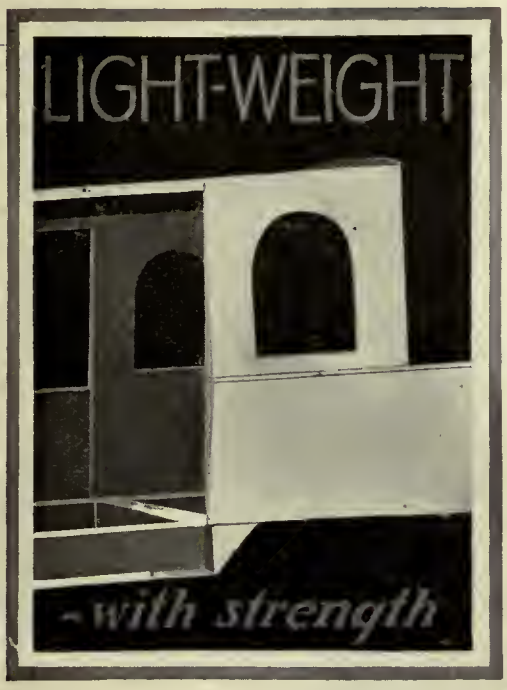
MASSACHUSETTS MOHAIR PLUSH CO.
Main Office:
80 Federal Street, BOSTON, MASS.
Makers of BAY STATE PLUSH

New York Agent:
Sisson Supply Co.
1845 Grand Central Terminal.
New York City

Western Agent:
Midgley & Borrowdale
1822 McCormick Building.
Chicago, Illinois

MASSACHUSETTS MOHAIR PLUSH

The railroad standard for over 35 years



Saving weight or Shaving weight ?



The Cincinnati Car Company has been preaching the gospel of light weight for the past 12 years. There's plenty of precedent and experience back of each step that has been taken.

Lightness, as exemplified by Cincinnati Balanced Cars today, results from the application of modern engineering principles and the employment of modern lightweight steels, *and not from any sacrifice of proportions or strength.*

Write us.

CINCINNATI CAR COMPANY
Cincinnati, Ohio

CINCINNATI BALANCED LIGHTWEIGHT CARS

The Four Features of BALANCED DESIGN *are the Cardinal Points of Today's Demand*



Safe Speed



Speed alone depends on motive power. *Safe* speed depends on brakes, etc. The power to stop must always exceed the power to go, and developments in brake equipment and the brake shoe are, therefore, of prime importance. American Brake Shoes have fully anticipated these requirements. Their scientific reinforcement and their uniform high friction have made it safe to go fast.



"Best by Test"

THE AMERICAN BRAKE SHOE AND FOUNDRY COMPANY

30 CHURCH ST., NEW YORK
332 SO. MICH. AVE., CHICAGO





The illustration above shows the Cambria Wheel Plant of Bethlehem Steel Company at Johnstown, Pa. Forged axles are also made at Johnstown.

BETHLEHEM

rolled steel wheels for Electric Railway Service

insure maximum mileage and safety



Other Bethlehem Equipment for Electric Railways:

Axles	*Armature Shafts*	*Gage Rods*	*Tie Plates*
Bolts	*Pole Line Material*	*Splice Bars*	*Tie Rods*
Frogs	*Special Layouts*	*Switches*	*Trackwork*
Rails	*Switch Stands*	*Crossings*	*Spikes*
	Gear Blanks	*Guard Rails*	

BETHLEHEM STEEL COMPANY, General Offices: BETHLEHEM, PA.

New York Buffalo Baltimore Atlanta *District Offices:* Cincinnati Detroit Seattle Los Angeles
Boston Philadelphia Washington Pittsburgh Cleveland Chicago St. Louis San Francisco Portland

Bethlehem Steel Export Corporation, 25 Broadway, New York City, Sole Exporter of our Commercial Products

BETHLEHEM



Three "musts" of fare collecting
SPEED-CONTROL-ECONOMY

SPEED Speeding up service hinges on rapid fare collection, even more than on mechanical equipment.

Machinery can accelerate vehicle movement, but passengers enter or leave only as fast as the fare collection system permits one man to collect and issue.

Tickets, transfers, passes, identification checks, zone fare receipts—that tear right, thumb smoothly and require least punching—cut vital minutes from the standing time.

With present-day mechanical efficiency, speeding up rush hour service can come only through faster loading and unloading—strictly a fare collection problem.

Our experience helps.

Globe
TICKET COMPANY

112 North Twelfth Street
PHILADELPHIA

NEW YORK BOSTON BALTIMORE CLEVELAND LOS ANGELES

WINDOWS DO MAKE A DIFFERENCE

Because Windows Are Important

Edwards Metal Sash

SINCE windows in the electric car and motor coach are either a source of annoyance or of comfort to the passengers, they are highly important.

Our experience of forty years in the making of window accessories for steam and electric railways led us to originate Edwards Metal Sash, which gives passengers the utmost in comfort.

Ample light, unobstructed vision, ease of opening and closing—and all with never a rattle!

Send for Catalog "S", liberally illustrated with views of modern electric cars and motor coaches.

TRADE PAOWNYC MARK EDWARDS



O. M. EDWARDS CO.

New York Syracuse, New York Chicago

Canadian Representatives:
Lyman Tube & Supply Co., Ltd., Montreal and Toronto



Malleable Iron—and thoroughly modern for the GE-265 Motor

This gear case possesses a unique feature—an overlapping joint, something new in malleable-iron gear case construction.

Overlapping of the halves keeps out dirt and moisture and affords a means of making adjustments to compensate for any wear of the supporting brackets.

This new gear case embodies the acknowledged advantages of malleable iron—rigidity and strength—yet its weight is no greater than that of the gear case formerly used with this modern lightweight motor.

General Electric is always striving to produce the most satisfactory railway equipment, as demanded by changing conditions and improvements in the industry. This new development, which makes possible the use of malleable-iron gear cases with GE-265 Motors, is a typical example.



For Modern Equipment Standards

54C-3

GENERAL ELECTRIC

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review
Published by McGraw-Hill Publishing Company, Inc.
CHARLES GORDON, *Editor*

Volume 70 New York, Saturday, December 10, 1927 *Number 24*

Under New Auspices in St. Louis

ANOTHER of the electric railways has just emerged from among those thrown into receivership largely as a consequence of the imposition of war-time economic conditions over which they had no control. The property to which reference is made is the United Railways, St. Louis. From now on the road there will function under the title of the St. Louis Public Service Company.

The way has been carefully prepared in advance, and the new management takes hold under auspicious circumstances, even though the franchise question remains to be adjusted. That is an important matter, but the task does not appear to be an insuperable one. The grant that has been discussed is of the service-at-cost type. The main differences of opinion have been over the matter of valuation and the rate of return. These negotiations have been followed in the news columns. The financial results under the receivership, notably those for the year ended Dec. 31, 1926, have also been reviewed in the JOURNAL.

Frank acknowledgment is made by the new management of the excellent work done by the receiver and by his general manager. More than this, however, the incoming régime has acknowledged the magnitude of the task it is tackling and has sought public co-operation at the inception of its incumbency. It senses the growing needs of the community. The avowed policy is to determine the character of the service desired by the public and then to supply that service. Having done this, the management assumes that the public will gladly pay the fare necessary to maintain it. The new management has made a sincere bid for public co-operation. It has pledged the company in unmistakable terms to do its part. The car riders and the public of St. Louis generally owe it not so much to the company as to themselves to be equally concerned for the welfare of the company. Only as each is concerned about the other can the company carry on successfully and the public benefit.

Experiment in Regulating the Cruising Taxi in Philadelphia

CRUISING taxis have long been the bane of officials intrusted with the problem of expediting street traffic. They run empty a large part of the time and so clutter the streets that they really are more nuisance than benefit. The very growth of the taxi business in large communities has served to defeat that vehicle's attractive features, particularly the feature of speed. In Philadelphia last winter things came to a very bad pass. Congestion there was unusually acute. In some instances it spelled defeat for everybody concerned. It was imperative that something be done. And something has been done. The Yellow Cab Company, under Philadelphia Rapid Transit Company auspices, and the Quaker City Cab Company have agreed to a working arrangement calling for the expansion of the idea of fixed stands in the central business district that would seem to hold forth great promise for the future. Its proposed use, beginning on Dec. 12, is described elsewhere in this issue.

So far as these companies were concerned the matter was apparently easy to arrange. Not so in the case of the Diamond and the Cunningham companies. They are among the smaller independents, and their officers felt that they must be permitted to continue cruising, since their revenue was derived almost wholly from this source. In this attitude they may have been justified, but it is the very attitude that has served to clutter up the streets with vehicles. The way out in this instance was found in their purchase by the Philadelphia Rapid Transit Company. It was a fortunate way for everybody involved, but it is a way not always possible. But the real interest is in what the two other companies have agreed to do. It is to be hoped that the arrangement now about to be put into effect will work out so satisfactorily that the expectation of the companies looking toward the gradual extension of the plan throughout the city may be realized.

Ballots on Engineering Standards Demand Attention

RECOMMENDATIONS of committees of the American Electric Railway Engineering Association are now being submitted to the membership for approval in accordance with the changes in the constitution and by-laws adopted at the Cleveland convention last October. So far returns from three letter ballots have been closed, covering proposed revisions of existing Manual sections or presenting additional sections for approval. The plan is a distinct advance over the old one of having a discussion on the convention floor, followed by an oral vote unless a division was called for. Under the old plan it was necessary for anyone desiring to take an active position favoring or opposing a recommendation to be present in person at the convention or to have an accredited representative. The opportunity for discussion was quite limited on account of the number of recommendations presented, since they covered the work of all the engineering committees for the entire year. Usually most of the recommendations were approved without discussion, and often without some members knowing just what they had voted on.

Contrast this with the new plan. Letter ballots are sent out to the entire membership. It is possible for the company official most familiar with the subject in question to give it his attention and to vote intelligently after mature deliberation and correspondence or conference if necessary. Accordingly, when a standard has been adopted in this manner it should have more weight and member companies should adhere more closely to it than when the former method was in force.

According to an article in the December issue of *Aera*, the returns from the first set of letter ballots were sur-

prisingly small. It would appear that the membership is not fully acquainted with the plan, particularly since quite a number of companies that are represented on the committees in charge of the standardization work did not cast ballots. With many questionnaires and miscellaneous matter being received constantly, it is not surprising that persons unfamiliar with the new plan might fail to refer the ballots to the proper officials in the organization. It does not seem reasonable that a committeeman who has followed the work should not be able to cast a ballot either for or against the proposed standard.

A second set of ballots was distributed under date of Nov. 2 and a third set under date of Nov. 25. To be counted they must be returned within 60 days. It is to be hoped that more of the member companies will consider the questions submitted and take definite action, since the value of the standards set up depends in large measure on the interest taken in their adoption and in their enforcement. A standard that is a dead letter is worse than useless, since it is misleading.

Standard Bus Accounts Desirable

UNTIL the committee on bus accounting of the American Electric Railway Accountants' Association promulgated its standard classification there was no generally recognized standard available. The committee did an excellent piece of work, and its classification, which has been indorsed by the National Association of Railroad and Utilities Commissioners, is based on the accounts adopted for electric railways by the Interstate Commerce Commission. The A.E.R.A.A. classification has been adopted by a number of bus subsidiaries of electric railways and also by some independents. It is giving general satisfaction.

Naturally, in a field so new as this, there is an opportunity for differences of opinion, and certain of the accounts may be handled in more ways than one. The same is true of any accounting. In order to have comparable statistics it is essential that the same system be used by all the carriers in the territory where comparisons are to be made, whether it is the state or the nation. Since operating methods differ little all over the country there seems to be small reason for a departure from a single system. On the other hand, there is more need for a difference in detail between large operators and small, since it would be burdensome to require the analysis for a small company that is demanded of the large one. This has been taken care of by the committee in the preparation of a condensed system of accounts for small operators.

When the Public Service Commission of Pennsylvania adopted a classification for bus accounts, to go into effect on Jan. 1 next, a number of changes were incorporated that result in more or less variation from the association's system. As mentioned in a news item in this issue, the principal differences are with respect to the handling of taxes, rents and depreciation. While there is some argument in favor of the changes, there is the stronger argument in favor of standardization.

At present two other commissions, those in Iowa and in Wisconsin, are contemplating the adoption of standard classifications for bus accounting. It would seem that now is the time to get together and reconcile all differences. Unless there are reasons for changing from the association's classification, that would seem to be the logical one to adopt. If reasons for a change exist, undoubtedly the committee will welcome suggestions and present them to the membership for adoption. Whatever is done, action should be taken before the various states adopt sets of accounting classifications with differences so great that two or more sets of books will be needed, as may be necessary for interstate operators.

European Roads Tending Toward Fare Simplification

WHILE it is common in this country to think of the street railways of Europe as charging zone fares exclusively, this is very far from true. The lines in England, France and Belgium generally use the zone fare system, but many of those in Italy, Germany and Switzerland do not. In fact, the tendency is rather from the zone fare to the flat fare. The introduction of more one-man cars will help in this direction, though as the wages of platform men are not as high in Europe as here, there is not the same inducement to the adoption of the one-man car.

The lower wages paid in Europe should be borne in mind when comparisons between European and American fares are made, as should also the fact that fewer free transfers are issued than in America. This rarity of the free transfer is an inheritance, probably, from the time when zone fares were in more general use. Where fares vary with the distance traveled, there is no occasion for transfers. When a zone fare road changes to the flat fare the public is not accustomed to transfers and does not expect them. In Europe, Berlin is the most important exception to the rule that universal transfers are not given.

Passenger revenues in Europe are still checked very generally through the issue by the conductor to the passenger of a paper receipt for the fare paid. On the flat fare roads, this practice seems to be still another inheritance from the zone fare system in which such receipts or something corresponding to them are necessary to prevent overriding. To an American, the fare box seems to provide a better means for collecting fares. It is at once less liable to manipulation, is cheaper and faster. Finally, it is neater because it keeps the car floor and street free from canceled tickets. However, here again the strength of long-established habits have to be taken into account. The public and the employees have become accustomed to the fare receipt. They do not mind its disadvantages and the companies declare that its abuse by either employees or passengers is practically nil. At present, progress in Europe in fare collection seems to be more in the direction of ticket-issuing machines than in the abandonment of the paper fare receipt.

The principal improvement in fare practice during the last few years in Europe has been in the direction of having only one class of fare. The Berlin Elevated is the latest large road to change from two classes to one. Among the surface roads those in France and Belgium appear to cling most strongly to the two classes of fares, using them, in some cities, even on cross-bench open cars.

There is no doubt that the system of fare collection used in this country is better adapted to American conditions than is the European plan. We should gain nothing on our flat fare lines by adopting the paper fare receipt, which is primarily a zone fare device. But there is much that can be said in favor of the European method of

operating through cars between all points where there is considerable travel and then refusing to give transfers. One reason for the low flat fares in many cities abroad is that a fare pays for only one ride, not two or three, as would be the case with transfers. By permitting a lower flat fare, this policy also increases the short-haul business, which is the one where a street railway has to meet competition from walking.

Head of Pennsylvania Motor Federation Condemns Parking

FREQUENTLY when experienced transportation men have pointed out the evils of automobile parking on congested streets they have been accused of attempting to force greater use of public transportation vehicles. But when the spokesman of more than a million owners of private automobiles says the same thing no such accusation can reasonably be made. Unusual significance therefore attaches to the remarks of R. C. Haldeman, president of the Pennsylvania Motor Federation, speaking before the meeting of the Pennsylvania Street Railway Association at Scranton last week.

"The present-day habit of using our streets as a public garage," he says, "is one of the greatest evils tending to increase congestion in the business districts of our municipalities. It is both a selfish and a time-wasting habit of the motor car owner. The individual apparently gives no thought to the inconvenience that his action places on the many. But if the individual still insists on being selfish let him consider the time he is wasting. It averages at least ten minutes to get the car out of a garage in the morning. He drives down town with his mind set on a particularly convenient locality in which to leave his car. At least 99 times out of 100 he finds that place occupied by an earlier riser and he spends ten minutes more looking for some other niche. It is probably three or four blocks from his office or wherever he desires to transact his business. Another ten minutes lost. Life is too short to throw away all this time to satisfy a purely selfish whim."

This states in a nutshell the case against automobile parking. It hurts the automobilist more than it helps him. The number of drivers who benefit is insignificant compared to the number who are inconvenienced, to say nothing of the great majority of the users of the street—the passengers in public transportation vehicles.

Unselfish co-operation between the automobilists and the public transportation systems is the remedy Mr. Haldeman recommends. He has done the public a real service by presenting such a definite, clear-cut statement of the situation. That is good, but the prime requisite today is more general understanding of the evils of parking.

"Narrow-Gage" Purchase an Important Move

SPECIAL interest attaches to the announcement of the purchase by Hemphill & Wells of the Boston, Revere Beach & Lynn Railroad and of the new owners' plans to electrify the system. This comparatively short narrow-gage line handles a relatively dense volume of passenger traffic, serving a limited area. For years its future has been under discussion. In the Massachusetts report on improved transportation facilities in the Boston metropolitan district two major recommendations were made affecting the Boston, Revere Beach & Lynn Railroad. The first was for the Boston Elevated Railway to extend its East Boston tunnel line to a junction in the vicinity of Wood Island station, thereby eliminating the necessity for providing ferry service. The second called for complete electrification of the system.

It is significant that one of the most important recommendations in the report is to be carried out forthwith. It is known that as far back as 1911 plans were prepared for such a project. Whatever the plans of the former owners might have been it is reasonably certain that the work would not have been ordered so soon.

The new service will mean much to the district. The modern cars, comfortable and attractive; the stations, remodeled for prepayment use and refinished, and the high-speed transportation to be maintained by the new electric trains should cause a large increase in patronage. Property owners will realize, too, that values will grow because of the new service. All in all, the purchase by Hemphill & Wells and their plan to electrify are very important moves not only in the districts served by the old Boston, Revere Beach & Lynn Railroad but in the entire electric railway industry as well.

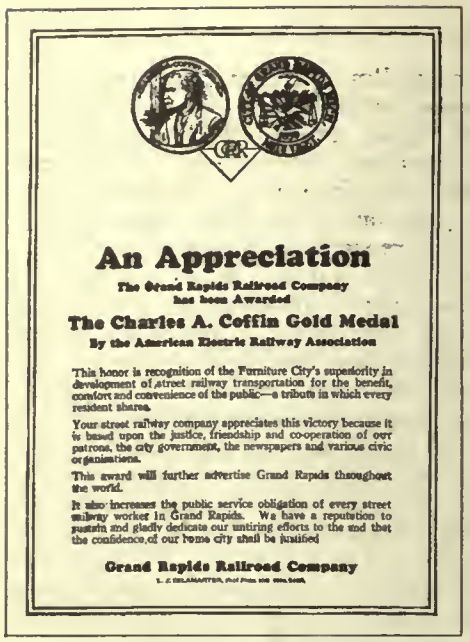
Glorifying the Coffin Award

ADVERTISING, it has been said, is just a combination of showmanship and salesmanship. Surely no better definition could be found for the sound and progressive advertising exploitation launched by Louis J. DeLamarter, vice-president and general manager Grand Rapids Railroad, after his road had submitted its Coffin Award brief and continued so effectively after winning the award.

To electric railway men the Coffin Award means a great deal. They realize that it is the highest honor that can come to any American system and that it represents the reward of progressiveness and superlative achievement in the industry. But to the ordinary layman it might represent almost anything. The task, then, of livening this issue in the minds of the citizenry of Grand Rapids befell Mr. DeLamarter, if winning the award was to mean anything in a dollars and cents way. His previous experience as a showman had taught him the value of capitalizing on public reactions. Accordingly he prepared, so to speak, all Grand Rapids for the possible winning by acquainting it with the Coffin Award and its significance.

The effect was far reaching. The people not only learned what the award was but also what it would mean to the city and to themselves. They realized that their own town was competing with cities such as Chicago and Atlanta and they felt a little prouder of their "Furniture City." A pride in the shiny new street cars that were being advertised the world over as "Grand Rapids" type cars swept over them, and a desire to help win was created among the various civic groups and individuals as well. The Coffin Award was publicized to so great an extent that it bids fair to remain alive for many years in the memories of all Grand Rapids people.

Truly the Coffin Award has been glorified under the impetus of a carefully conducted advertising plan until now it represents to the people of Grand Rapids an "emblem of civic virtue, a badge of merit and a symbol of communal achievement." And all because one alert electric railway salesman realized the capitalization possibilities of such a proposition under the stimulus of a sound and progressive plan of advertising exploitation.



An Appreciation

The Grand Rapids Railroad Company has been Awarded

The Charles A. Coffin Gold Medal

By the American Electric Railway Association

This honor is recognition of the Furniture City's superiority in development of street railway transportation for the benefit, comfort and convenience of the public—a tribute in which every resident shares.

Your street railway company appreciates this victory because it is based upon the justice, friendship and co-operation of our patrons, the city government, the newspapers and various civic organizations.

This award will further advertise Grand Rapids throughout the world.

It also increases the public service obligation of every street railway worker in Grand Rapids. We have a reputation to sustain and gladly dedicate our untiring efforts to the end that the confidence of our home city shall be justified

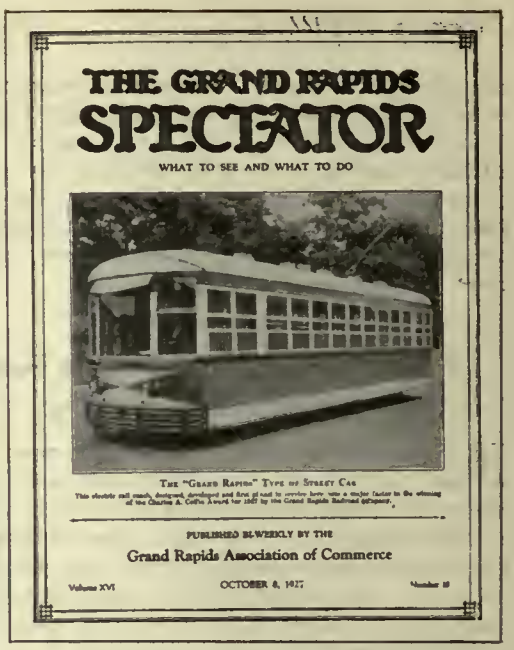
Grand Rapids Railroad Company

Advertisement carried by the railroad in all weekly newspapers. Full page ads were carried in the daily newspapers of Grand Rapids



Coffin Award Crowns DeLamarter's Efforts

Committee of Electrical Engineers and Traction Managers Pays Highest Tribute To Innovations and Policies Here



THE GRAND RAPIDS SPECTATOR

WHAT TO SEE AND WHAT TO DO

The "Grand Rapids" Type of Street Car

PUBLISHED BI-WEEKLY BY THE Grand Rapids Association of Commerce

Volume XVI OCTOBER 8, 1917 Number 10

Above, the cover of the Grand Rapids "Spectator." In center, newspapers proved a powerful aid in publicizing the award

Capitalizing the Coffin Award

All Grand Rapids knew in advance of the Coffin Award and its significance, because of a careful plan of advertising. When the medal was won enthusiasm became universal and citizens joined the railroad in acclaiming the victory

DETERMINED to capitalize to the fullest extent his company's entering the Coffin Award contest, L. J. DeLamarter, vice-president Grand Rapids Railroad, Grand Rapids, Mich., planned a series of car cards and gave details of the contest to all the local newspapers for publication. He explained to the people of Grand Rapids just what the Coffin Award was and what it meant, showed them the wares of his railroad and sold the thought that in their city existed the most progressive street railway system in the country. Few, if any, disputed the company's chance of winning, even though it was competing with much larger roads.

Upon winning the award, the railroad immediately spread the news. Car cards, newspaper write-ups and full-page advertisements in the local papers told the people of Grand Rapids that the great honor about which they had already been informed had been bestowed upon the railroad of their city. Many business houses of the city congratulated the railroad in advertisements carried in the local papers and profited with the company in the winning of the award. Resolutions, congratulatory letters and messages poured in and editorial columns praised the city's electric railway which had proved itself supreme.

Six progressive car cards told the story in an effective manner. They related that Grand Rapids was competing with cities such as Chicago and St. Louis, that winning the Charles A. Coffin Award corresponded to winning the World's Championship in baseball, that the medal if brought to Grand Rapids would advertise the city throughout the world, and that the railroad's biggest asset was the splendid, progressive spirit of Grand Rapids people. The copy of the first card reads:

To our patrons:

Your Street Railway is competing with Chicago, St. Louis and other large cities for the

Charles A. Coffin Gold Medal

given each year to the street railway whose achievements represent the most distinguished contribution for the benefit and convenience of the public.

If Grand Rapids wins, it will be largely because of your sympathetic co-operation, your moral support, your patronage.

This was followed by a card pointing out the importance of the award to the industry and the road winning it.

The Charles A. Coffin Gold Medal Will Be Awarded to Some City Early in October.

In the street railway industry, it is like the World Championship in baseball.

We are after this "world championship" for Grand Rapids. If we win, it will be more of a victory for Grand Rapids and Grand Rapids people than for the Grand Rapids Railroad Company.

All publicity conveyed the feeling that the city and its people and not the efforts of the railroad were responsible for the progressiveness of the street railway system. The people were made to believe that they were competing

and that in the event of winning, the victory would be theirs. Another of the cards best exemplifies the theme of the advertising plan as a whole:

We cannot hope to compete with such cities as Chicago and St. Louis on the basis of miles of track, number of cars or volume of business. But we have an asset in the splendid, progressive spirit of Grand Rapids people with which we do not hesitate to challenge the world.

If We Can Win the Charles A. Coffin Gold Medal for Grand Rapids, It Will Be a Triumph for Your City and for You.

Newspaper publicity supplemented the car cards in relating the purpose and history of the contest, the names of the competing railways and how the prize of $1,000 would be given to employees' benefit organizations, if won. The papers also pointed out that the brief submitted by the railroad company had stressed the importance of the enthusiastic, loyal and sympathetic cooperation of the Grand Rapids municipal authorities, newspapers, civic organizations and general public as the predominating argument for the favorable consideration of the judges.

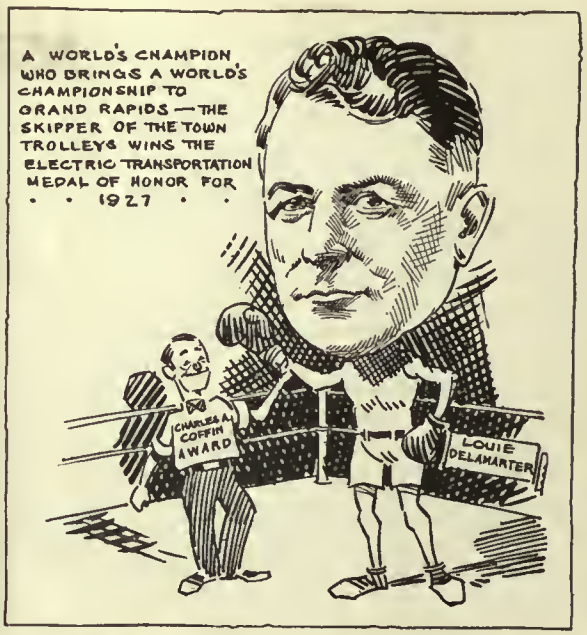
The following statements by Mr. DeLamarter, published in the local papers on Sept. 30, conveyed a feeling of confidence that the company did have a chance against its powerful competitors:

It may seem presumptuous to some of the bigger companies in the street railway industry, and to some of the Grand Rapids people for the Grand Rapids Railroad Company to enter this competition with the leading companies of the United States, but we are just egotistical enough to believe that our showing here with our new electric rail coaches and other innovations is rather conclusive evidence that "Grand Rapids Knows How."

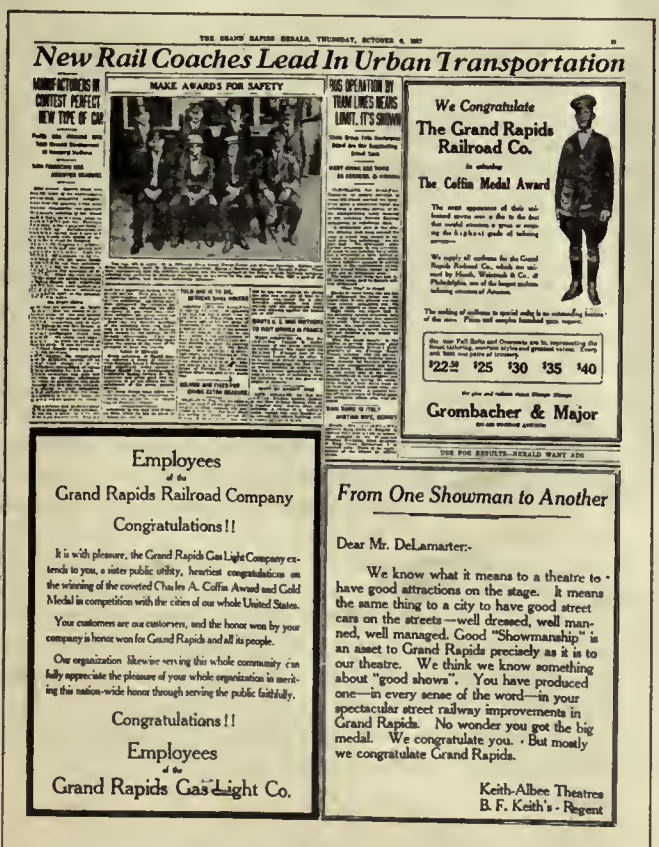
If we should win this award, against the stiff competition of Chicago, St. Louis and the other large cities of the country, it must be largely on the strength of the friendly, constructive assistance and co-operation we have had in Grand Rapids. In sheer bulk and volume of business, mileage of track, number of cars, etc., we could not hope to compete successfully against the great centers of industry and population.

Public relations, economy, progressive methods, safety and efficiency of operation are not elements measurable by mere size, so on these points the Grand Rapids Railroad Company is justified in entering into competition with any of them.

The business-like preparation of the advance publicity served well the purpose for which it was intended. All Grand Rapids had contributed and upon the eve of announcing the winner all Grand Rapids eagerly awaited



Cartoon appearing in the "Razzing the Rapids" section of the Grand Rapids "Herald"



Local merchants and companies congratulated the railroad in advertisements carried in special sections of the local papers



Another page from a "Gold Medal" edition. All Grand Rapids rejoiced in the victory of the railroad company

GRAND RAPIDS, MICH., Oct. 26, 1927.

MR. L. J. DELAMARTER,
Vice-President and General Manager

DEAR SIR:

The Grand Rapids Railroad Company's Employees' Mutual Protective and Benefit Association wishes to again congratulate you on your success in winning the Charles A. Coffin Award for our company. We also appreciate being recognized as helping to do our bit toward winning this award and we, as an association, pledge ourselves to keep our shoulders to the wheel to help maintain the high standard which has been achieved, and we stand ready to help in any further cause you may desire toward the betterment of our company.

At our meeting held Tuesday, Oct. 25, it was voted to extend you a rising vote of thanks for the $500 prize money and the splendid entertainment furnished us on the 19th, which was greatly enjoyed by all present. It is very pleasing to our members to hear the words of praise spoken by our passengers of the way this prize money was distributed by you, and we wish to assure you that we all feel proud to be associated with a company that has gained such high honors.

Very truly yours,
MAX HANNA,
Secretary Grand Rapids Railroad Company's Employees' Mutual Protective and Benefit Association.

"Proud to be associated with the company" is the keynote of this letter from the employees' protective association

the decision that might bring to their city the title of "Gold Medal City."

When the news broke everyone rejoiced. The stage had been set and the citizenry joined the railroad in acclaiming the victory. The company officially announced the receipt of the award by full-page newspaper advertisements, by advertisements carried in weekly publications and by car cards.

GRAND RAPIDS, MICH., Oct. 13, 1927.

MR. L. J. DELAMARTER,
Vice-President and General Manager
Grand Rapids Railroad Company,
Grand Rapids, Mich.

DEAR MR. DELAMARTER:

We, the officers and members of Division 836, congratulate you and the Grand Rapids Railroad Company for the opportunity given us to do our bit in winning the Coffin Award.

We realize it was only through the efforts of you, Mr. DeLamarter, that this was made possible, and we again congratulate and thank you.

Very truly yours,
CLAUDE W. FISHER,
President Division 836 Amalgamated Association of Street and Electric Railway Employees of America.

Letter of appreciation from the Amalgamated Association revealing the fine spirit existing between the employees and the management

Newspapers, merchants and railroad all joined in capitalizing the victory, for on the day following the announcement advertisements congratulating the railroad on its accomplishment were given to the papers by many local companies and merchants, as well as two railway equipment manufacturers, the Haskelite Manufacturing Corporation and the St. Louis Car Company. One paper devoted an entire section to acclaiming the victory. Others responded with "Gold Medal" editions.

The complete success of the railroad's educational plan was best evidenced by the many editorials appearing in the newspapers and the felicitations tendered Mr. DeLamarter and his associates by civic bodies, publications, social organizations and other groups. There followed resolutions, telegrams and complimentary speeches. The enthusiasm, which became universal, was climaxed by a dinner gathering at which Mr. DeLamarter and his associates were paid high tribute.

Typical of the telegrams congratulating Mr. DeLamarter and his company is the one sent by the Governor of Michigan:

Permit me to congratulate you upon award of Charles A. Coffin gold medal. It is splendid recognition of work well done.
FRED W. GREEN
(Governor State of Michigan)

Another, from a State Senator, shows the feeling of indebtedness inspired by the railroad:

Accept my congratulations upon having received the Charles A. Coffin gold medal. The city of Grand Rapids has been honored through your untiring efforts and is indebted to you for same. I anxiously await your return to congratulate you in person.
JAMES C. QUINLAN
(Senator State of Michigan)

Bespeaking the sentiments of the entire city, the Mayor of Grand Rapids wired:

Congratulations on receiving the Coffin Award. Your work here certainly justifies that distinction. The entire city unites in these felicitations. ELVIN SWARTHOUT
(Mayor City of Grand Rapids)

A desire to exhaust all the capitalizing possibilities of receiving the honor prompted Mr. DeLamarter to take further steps. At a big party for all the company's employees two checks of $500 each, representing the cash prize which accompanied the Coffin medal, were presented, one to the president of the local division of the Amalgamated Association of Street and Electric Railway Employees of America and the other to the president of the Grand Rapids Railroad Company's Employees' Mutual Protective and Benefit Association. A musical program and a speech by Dr. A. W. Wishart of Grand Rapids, who lauded the co-operation of the employees and management, made the evening a most enjoyable one and added to the effectiveness of distributing the cash prize.

A final ambassador of good will was sent forth to the people of Grand Rapids in a sincere expression of appreciation of the "justice, friendship and co-operation of our patrons, the city government, the newspapers and various civic organizations." Tying together reproductions of the Coffin Medal, the City Seal and the company's triangular shaped monogram to be painted on the cars, the advertisement struck the keynote of the whole campaign.

In addition to placing this new design on the cars, gummed paper replicas of the front and reverse of the medal have been made in gold for use as stickers on company correspondence, carrying far and wide the information that Grand Rapids won the Coffin Award.



Wide-angle full-vision side windows with 42-in. post centers add to the attractiveness

De Luxe Trend

Shown in the New Brill Car

The 1928 model, as it is called, has graceful lines, sloping front end, motors spring mounted crosswise of trucks using Nuttall speed reducing units with helical gears

LIGHT weight, low floor height, improved appearance, greater comfort, increased efficiency and less noise are features of the new Brill 1928 model electric car which was shown to the electric railway industry for the first time at the Cleveland convention and has just been placed in service on one of the surface lines in Brooklyn. Tests of the cars were made in Cleveland immediately following the convention.

This development in car construction embodies many features that are entirely new to the electric railway industry, yet at the same time it retains most of the fundamentals in design and construction that have been responsible for the economic advantages of the electric car. In the design of this car the Brill company has recognized the importance of substantial construction for safety and durability. Low maintenance costs have been considered, together with a design that will be reasonably light in weight and of low energy consumption, rapid acceleration and retardation in order to speed up operating schedules.

While all of the radical features of design introduced in this car are of particular interest, the innovations in the trucks, especially the manner in which the high-speed motors are mounted and the method that is used to transmit power to the axles, are of outstanding importance. Two Westinghouse 35-hp. 300/600-volt d.c. motors are supported on angle brackets between the end frames and transoms so that their entire weight is spring mounted, leaving only the wheels, axles, roller bearing journals, brake drums and half of the gear units as unsprung weight. The motors are connected by universal fabric joints to the specially developed reduction gear unit of Nuttall deep helical type. The gear ratio is 8.38 to 1.

This achievement is the result of three years of experimental and practical engineering development together with test work. The Westinghouse-Nuttall drive is a unit of gears operating entirely in oil so designed that 22-in. wheel trucks may be used with greater clearance under the motors than was formerly possible with 26-in. wheels. This drive is quiet running, permits the use of motors higher in speed and lighter in weight than is usual, and makes it practicable to use roller bearings for the armature. Axle bearings are eliminated from the motor, as it is entirely spring borne through a truck frame suspension. The result is rapid, smooth acceleration, high efficiency and low maintenance cost. With the gears inclosed and constantly lubricated, it is logical that gear noises will be reduced to a minimum. In other general features the trucks, which are type 277-Ex-1,



The equipment cabinets at the ends fit into the sloping fronts and give a finished appearance

conform to conventional practice. The side frames are solid forgings, light in weight. The graduated spring system contributes to the smooth and comfortable riding.

As a further means of reducing noise, instead of using shoe wheel brakes a brake drum is located on each axle, against which a set of clasp-type brakeshoes of special design are pressed by means of a separate Westinghouse brake cylinder for each drum. The brake mechanism is of the external contracting clamp drum type with two shoes or blocks per drum, the shoes being of a special composition, suspended in such a manner that they are practically noiseless. By mounting the cylinders on the truck instead of on the car body, considerable body brake rigging is eliminated which would have a tendency to cause rattling and disagreeable noise. The air brakes are

TABLE I—TEST ON BRILL 1928 CAR, CLEVELAND RAILWAY —EUCLID AVENUE LINE POWER CONSUMPTION

Car Weight 30,000 lb. Load 4,860 lb. Total 34,860 lb.
Four Westinghouse Type 1425 Motors 8.38:1 Gear Ratio 22-in. Wheels

Location	Mileage	Meter Reading	Kw.-Hr.	Kw.-Hr. per C.M.
Windermere Windermere	13.22	237.8 270.5	32.7	2.47
Windermere Windermere	13.22	277.8 311.4	33.6	2.54
105th St. Windermere	10.74	330.0 353.5	23.5	2.18
Windermere Windermere	13.22	354.8 386.7	31.9	2.41
Windermere Windermere	13.22	387.7 418.5	30.8	2.33
Totals.....	63.62		152.5	2.4

Westinghouse electro-pneumatic type. Timken roller journal bearings are used.

The car body is constructed of pressed steel and structural shapes with aluminum letter panels and side sheathing. The body design conforms generally to the graceful lines of the motor bus. While a tendency is shown to reduce weight, particular attention has been given to providing necessary strength so as to stand up under the severe requirements of electric railway operation. Side sills are 3-in. x 3-in. x $\frac{5}{16}$-in. angles and end sills are of a box type built up of two 3-in. channels as sides with top and bottom plates. Crossings are of pressed-steel fish-belly type. Outside platform knees are 7-in. channels and center platform knees are 3-in. channels. Bolsters are of the box girder type with $\frac{1}{2}$-in. bottom plate, $\frac{3}{8}$-in. top plate and $\frac{3}{16}$-in. web. The latter are fastened to each other by means of diaphragm connections.

The body frame has pressed U posts of No. 16 gage steel and a double-belt rail of aluminum, $2\frac{1}{2}$ in. x $\frac{3}{8}$ in. The letter panel is $\frac{1}{8}$-in. semi-hard aluminum, $15\frac{1}{2}$ in. deep. Aluminum gutters form the top molding and half oval aluminum is used for the bottom. The letter panel has U-pressings at the top. Panels are curved at

TABLE II—ACCELERATION TEST ON BRILL 1928 CAR, CLEVELAND OHIO—OCT. 19, 20, 1927

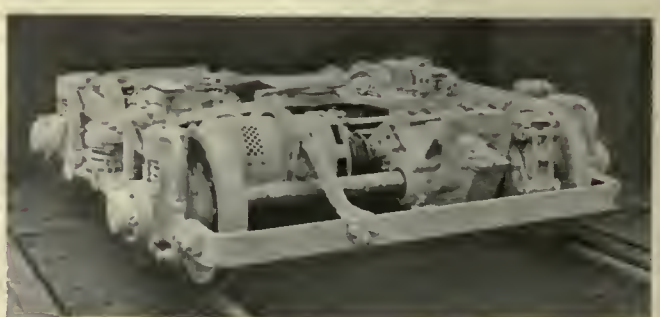
Car Weight 30,000 lb. Load 5,000 lb. Total 35,000 lb.

Test No.	Amperes per Motor	Trolley Volts	Distance Feet	Time Seconds	M.P.H.P.S. from Distance	M.P.H. M.P.H.P.S. from Motor Curve	M.P.H.P.S. from Motor Curve
Windermere Yard							
1	177	570	20	3.2	2.7	11.8	3.7
2	162	565	30	4.6	1.9	12.0	2.6
3	177	563	25	3.8	2.4	11.7	3.1
4	162	563	25	4.0	2.1	12.0	3.0
5	162	548	25	3.4	3.0	11.8	3.5
6	141	562	40	5.2	2.0	12.7	2.4
7	141	557	40	4.8	2.4	12.4	2.6
Kuhlman Track—Toward St. Clair Avenue							
8	150	555	30	4.0	2.6	12.0	3.0
9	171	563	25	3.4	2.9	11.6	3.4
10	186	548	15	3.2	2.0	11.2	3.5
11	198	530	10	2.0	3.4	10.6	5.3
12	204	530	10	2.4	2.4	10.6	4.4
13	195	553	13	2.6	2.6	10.9	4.2
14	201	555	13	2.4	3.1	10.7	4.4
Kuhlman Track—Away from St. Clair Avenue							
15	207	545	15	2.4	3.5	10.9	4.5
16	210	535	13	2.6	2.6	10.5	4.0
17	213	535	13	2.2	3.7	10.5	4.8
18	219	545	15	2.2	4.2	10.5	4.8
19	225	520	10	1.8	4.2	10.3	5.7
20	222	535	15	2.0	5.1	10.4	5.2
21	165	550	40	5.2	2.0	11.5	2.2
22	174	545	40	4.4	2.8	11.3	2.6
23	150	565	30	4.2	2.3	12.2	2.9

the floor line and side sheets are of hard aluminum, $\frac{1}{8}$ in. thick. The window sill capping is No. 16 gage steel, and pressed gussets are used at each crossing. The posts have ash fillers and all sheet steel is copper bearing. End headers are eliminated and corner posts and end carlines are of special design. Joints between the window sill and post are welded.

Vestibules have a width of 7 ft. at the car body and are tapered toward the front. The front sash is sloping, similar to that in the Springfield car. This has a visor and ventilator in back of it. The construction below the windows is also of the Springfield car type.

The roof is $\frac{5}{16}$-in. plywood. Roof rafters are of pressed U shapes filled with wood and not cut. The roof is fastened to the rafters with glue and screws and crowned $10\frac{1}{2}$-in. Hoods are of plywood. Unusually low floor height has been obtained with the use of 22-in. diameter wheels. This small-diameter wheel was made possible only through the use of smaller motor dimensions and a reduction in the amount of equipment under the car body. The car floor is only $28\frac{3}{4}$ in. above the rail. Consequently but two steps are required. These are stationary inside the folding doors. The first is 15



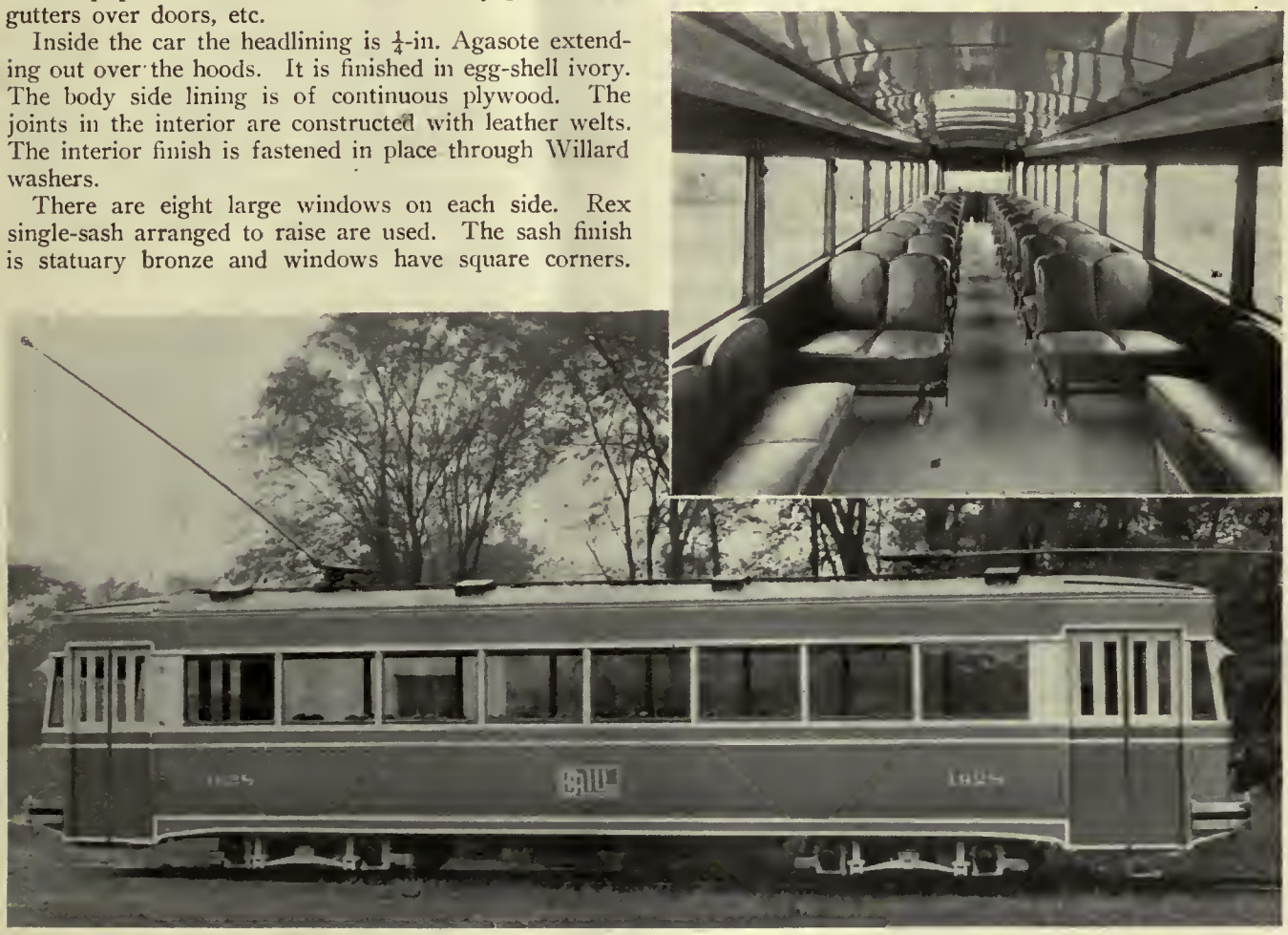
Motors mounted on the truck frame parallel to the axles are connected to gear boxes through universal joints

in. above the rail and the second 13¾ in. to the car floor. There is no floor ramp. The flooring is 1 1/16-in. fir, top dressed and treated with Saums preservative. The floor is laid longitudinally and is bolted to cross members. There are no trap doors. The floor covering is 3/16-in. battleship linoleum, green in color.

On the roof two running boards, ⅞ in. thick by 5½ in. wide, extend the full length of the body. The trolley base is insulated from the trolley boards with rubberized felt. Eight steps are available for roof mounting and other equipment includes roof mats, trolley pole hooks, gutters over doors, etc.

Inside the car the headlining is ¼-in. Agasote extending out over the hoods. It is finished in egg-shell ivory. The body side lining is of continuous plywood. The joints in the interior are constructed with leather welts. The interior finish is fastened in place through Willard washers.

There are eight large windows on each side. Rex single-sash arranged to raise are used. The sash finish is statuary bronze and windows have square corners.



Built low to the ground the Brill 1928 car invites prospective passengers. Walnut finish for the interior with brown leather seats with sloping cushions and backs to give a pleasing effect

Each sash has two locks and racks. Plate glass 3/16 in. thick is used in the stationary front sash for the vestibules. The small side sash of the vestibules, and all other glass in the body, side windows and doors are of ⅛-in. selected Libbey Owens glass.

Doors are 1 1/16-in. mahogany with no glass below the belt rail. The doors are of a two-part folding type arranged to swing outward and have a 34-in. opening in the clear. They are located at each corner of the platform. Automatic treadle devices are placed at the rear right-hand side doors. For operation small-type engines are used. The car being arranged for one-man, double-end operation, entrance at the front and exit at the rear insure circulating load.

Bumpers are solid with a projection of 6 in. They are secured to the vestibule underframe by spring-steel brackets. Bumperettes are provided at corners.

Inside the car body Brill type 201-B-1 passenger seats embody a slope to the cushion and pitch to the back designed to provide maximum passenger comfort. All seats are in keeping with the modern trend in this direction. A Brill No. 1006 operator's seat at each end is not only adjustable for leg length by a sliding device but is also adjustable for height, and is reversible so that it can be used as a passenger seat when the car is going in the opposite direction. When in position it is locked by a clamp. Operating equipment is concealed in vestibule cabinets so that there is nothing to mar the beauty of the mahogany interior trim, which is stained walnut. This, together with the sloping windshield at each end, gives an inviting appearance.

The exterior paint scheme is a plain, pleasing combination to carry out the streamline effect. Old rose or clover club color is used for the main body panels and letter panels, with the relief trimmed in cream. Striping and decorations are of gold leaf. The roof is dark green and the trucks are the same color to harmonize with it. The finish used on the car is Duco.

A notice "Watch Your Step" is stenciled on each step riser, and the words "In" and "Out" appear over the doors—"In" for the front doors, and "Out" for the rear doors. Inside the car the words "Leave at Rear Door" appear on the ventilator cover over the operator's position.

Located over the vestibule windows in the letter panel is a sign of the Hunter type carrying route number and destination readings.

To obtain data on the performance of the 1928 model

car, tests were conducted over the tracks of the Cleveland Railway and also at the plant of the G. C. Kuhlman Car Company. Information was obtained showing the maximum temperature rise of the motors in city service, energy consumption, maximum rate of acceleration and retardation, coasting resistance, and freedom from noise. The service tests were made on the Euclid Avenue line. To approximate the average all-day load, brake shoes were placed on the car. This, together with the test

TABLE III—BRAKING TEST ON BRILL 1928 CAR, CLEVELAND, OHIO, OCT. 20, 1927

Test No.	Distance to Stop in Feet	Seconds to Stop	M.P.H. at Start of Braking	M.P.H.P.S. Braking Rate
1	62	4.4	19.2	4.4
2	75	5.0	20.5	4.1
3	85	5.4	21.3	4.0
4	80	5.0	21.8	4.4
*5	110	6.2	24.2	3.9
**6	100	6.0	22.7	3.8
**7	85	5.5	21.1	3.8
**8	110	5.8	25.9	4.5
**9	110	6.0	25.0	5.0

* Emergency braking from dead-man's handle.
** Emergency braking from air brake handle.

observers, gave a total load of 5,000 lb. With the 30,000 lb. weight of the car, this made 35,000 lb. for the average weight of the car in all day service. For convenience in segregating the various data the line was divided into sections, one being in a congested district and another in a non-congested condition.

In the test to determine energy consumption the meter was connected to read only the energy supplied to the traction motors and did not include that used by lights, heaters or compressors. Accompanying tables show the data obtained. The tests show an average of 2.4 kw.-hr. per car-mile for 63.6 miles operation between Windermere and the public square. Energy used in turning the car at Windermere and other operation not representative of revenue mileage was neglected. Operation was during the most congested hours when stops were most frequent. Due to operation between cars on regular runs, the car was not operated in the same manner as would be a car in revenue service, since acceleration and braking in many cases were faster. In the service on Euclid Avenue there were no hills, hence no power is included for the effect of grades as encountered in most cities. The results, however, show what can be expected for the service and grades on this particular line.

To determine acceleration rates, the car was tested on a section of tangent and practically level track. Starting was from the same point in all tests, the controller handle being moved by the operator at practically a uniform rate. Meters gave the trolley voltage and current per motor. The time to reach full parallel position of the controller was recorded and the distance from the start to the end of the acceleration on resistance was also obtained. Readings were made instantaneously and simultaneously.

No attempt was made to obtain the maximum acceleration during every test and the results in the table are for various rates to ascertain the effect on both the car and passengers during normal and high car acceleration. In one test more than 5 m.p.h.p.s. acceleration rate was obtained. The wheels were just at the slipping point and it would therefore appear that this rate is the maximum possible. This is probably three times as high as is normally employed on most railways. In regular operation acceleration rates of 2 to 2¼ m.p.h.p.s. can be maintained without difficulty.

In making the test for high and maximum braking rates, the car speed was obtained by measuring the distance covered from the time the brakes were applied to standstill, and recording the time for this distance. From these observations car speed and retardation rates were calculated. Tests were made to obtain average service braking as well as emergency results, this latter being from both the dead man's feature and the emergency position of the air-brake handle. The emergency results from the dead man's handle showed 3.9 m.p.h.p.s. braking rate. Emergency stops made with the air-brake valve gave rates from 3.8 to 5 m.p.h.p.s. An accompanying table gives other tests. These braking rates are very high for street cars, but were not sufficient to cause discomfort to a passenger except at the final jerk when the car came to a stop. In service, when the operator applied the brake to slow down at a high rate and then eased off before stopping, the sensation of high braking rate was not objectionable. These tests indicated that braking rates of from 3 to 4 m.p.h.p.s. could be obtained in revenue operation if the car were late and an attempt made to make up time.

To obtain values of coasting resistance, a section of tangent and approximately level track between Highland and Cove Avenues on Clifton Boulevard was measured accurately to obtain the distance between poles over a stretch of twelve pole spacings. The car was accelerated to a speed of 20 to 25 m.p.h. and power then shut off a short distance from the first pole. At the first pole a stop watch was read and the time obtained for each pole spacing as the car coasted past. From this time and the distance the average speed in the section was obtained. The rate of decrease of this average speed is the retardation rate of the car. Tests were repeated several times from various speeds, and in both directions to compensate for any slight wind velocity and for any grade. The

GENERAL DIMENSIONS OF BRILL 1928 MODEL CAR

Length over corner posts	30 ft. 0 in.
Length over vestibules	39 ft. 8 in.
Length over bumpers	40 ft. 8 in.
Length of platform over vestibule	4 ft. 10 in.
Length of transverse seats	35 in.
Width of car at belt rail	8 ft. 4 in.
Extreme width	8 ft. 4¼ in.
Height, rail to top of floor	28¾ in.
Height, top of floor to top of roof	7 ft. 2 in.
Height, floor to underside of ceiling at centers	6 ft. 10 in.
Height, floor to belt rail	30¾ in.
Height of window opening	29½ in.
Height, rail to top of step	15 In.
Height, top of step to platform floor	13¾ in.
Truck centers	20 ft. 0 in.
Truck wheelbase	4 ft. 10 in.
Seat centers	2 ft. 7 in.
Post spacing	42 in.
Size of wheels	22 in
Seating capacity	45
Weight of car body	12,636 lb.
Weight of seats	1,814 lb.
Weight of electric control apparatus	1,300 lb.
Weight of air brakes	1,200 lb.
Weight of trucks less motors and gears	9,026 lb.
Weight of motors and gears	4,024 lb.
Total weight of car complete ready to run	30,000 lb.

results show the resistance varying from 32.1 lb. per ton at 25 m.p.h. to 13.7 lb. per ton at 10 m.p.h. These values of retardation resistance are for coasting only and do not represent values of train resistance during the time the motors are drawing power from the line. During acceleration the train resistance is less than the values given above for coasting resistance.

Tests of heating showed that the motor capacity was ample for the service. The maximum temperature rise obtained was 31.5 deg. C. Observations of noise made by the car, both inside and outside, showed considerably less than on most cars. This was due to the small value of unsprung weight, which reduces noise at rail joints and on special work, and to decreased noise in gearing.

San Francisco Purchase Urged

Delos F. Wilcox recommends to city that it take over railway properties as the franchises expire. Offer of $1,000,000 for California Street Railway and $20,000,000 for Market Street Railway suggested

SAN FRANCISCO received a preliminary report on its street railway problem submitted by its expert, Dr. Delos F. Wilcox, under date of Nov. 1, 1927, and it is now available in printed form. It is devoted primarily to recommendations as to action by the city following the early expirations of a number of the franchises of the two street railway companies now operating in San Francisco. There are also comments on the policy of unification of these systems with the present San Francisco Municipal Railway, all to be under municipal ownership and operation.

One of these roads, the California Street Cable Railway, operates a narrow gage cable railway with 11 miles of single track, and its franchises expire in 1929. Dr. Wilcox considers that operation by cable, at least over large portions of the route of this company, should be continued. The company has no funded debt. On its $1,000,000 of capital stock it has been paying dividends of 7.2 per cent, though, of late, these dividends have not been earned in current operation. They have been paid out of accumulated surplus.

In 1926 the total operating revenue was $532,537, or 38.24 cents per car-mile, but the operating income after taxes and depreciation was only $9,858. During the first half of 1927 there was an operating deficit. This poor recent showing is due in large part to extraordinary expenses for personal injuries, which during this six-month period amounted to more than 31 per cent of the operating receipts. For the last five years—1922 to 1926 inclusive—this charge was only 5.28 per cent, a more reasonable figure, though still nearly double that on the municipal railway and Market Street Railway.

Basis of Valuations Adopted

No valuation of the company's property has been made by the Railway Commission or city engineer, but, based on the city engineer's figures for somewhat similarly situated cable lines belonging to the Market Street Railway, the reproduction cost new of the California Street line is estimated at $1,938,432. If 30 per cent is deducted for depreciation and $125,000 for paving which would belong to the city upon expiration of the franchises, the amount left would be $1,231,902.

If the California Street line was taken over Dr. Wilcox points out that the city would lose the taxes now paid by the company, which last year amounted to $49,858, but that amount would be saved from the operating expenses. On the other hand, the trainmen's wages would have to be increased from the company's standard of $1.12 per car per hour to the municipal railway's standard of $1.63 per car per hour. On the basis of car-hours run in 1926 the increase in trainmen's wages would be $98,910. On the basis of the company's five-year average the operating income available for return would then be approximately $26,000 per annum, or the equivalent of 5 per cent on $520,000. This figure, Dr. Wilcox says, may be considered as the amount of money which the city could afford to pay for this property with the hope of being able to pay operating expenses and interest on the investment under a 5-cent fare.

The property of the Market Street Railway, the principal privately owned line, was valued by the California Railroad Commission engineers as of Dec. 1, 1916, and in the reorganization case these engineers brought the figures by book additions and deductions up to June 30, 1920. The figures on four bases as found by them at that time follow:

Historical reproduction cost	$29,929,069
Historical reproduction cost, less depreciation	24,677,808
Reproduction cost new, based on average prices of the three-year period ended June 30, 1920	50,571,625
Reproduction cost new, less depreciation	40,700,987

Commenting on these bases, Dr. Wilcox says:

Historical reproduction cost as found included the present market value of land as of the date of the appraisal, plus an amount for other property based on the actual work done and the actual quantities in place at the date of the appraisal and an estimate of what the actual cost properly chargeable to capital account had been. This estimate included contingencies in varying percentages applied to individual accounts, and general overheads for engineering, law expenditures, interest during construction, injuries and damages, taxes and miscellaneous expenses aggregating about 13½ per cent of the base cost of the structural property.

Historical reproduction cost less depreciation was intended to represent the historical cost new as above defined, less accrued depreciation "considered solely from the physical condition standpoint" and "estimated on the straight-line theory, the data forming the necessary elements of age and life being fixed respectively from the records, inspection and the experience of this company." In its effect, the finding of accrued depreciation as of the appraisal date, June 30, 1920, was that the property was in 80 per cent condition, or, in other words, worth four-fifths what it would have been worth if new. On the basis of estimated cost, the average condition of the investment as found was slightly higher, namely, 82 per cent.

The term reproduction cost new as used in this appraisal was defined as "the estimated cost in cash of reproducing the physical property of the public utility in the State of California, as of the date of valuation, to which is added the value of all lands, based on the market value of adjacent and similar lands, the actual or estimated cost of acquiring franchises, water rights, etc., and the estimated cost of overhead expenditures for engineering, law, interest and similar items." As above shown, the price basis used was the average of construction costs for the three-year period ended June 30, 1920. That date was approximately at the peak of the street railway construction costs following the war.

Dr. Wilcox says that the 1920 figure for reproduction cost new, quoted above, obviously does not show its value now or in 1929, when the franchises expire. With the historical reproduction cost the condition is very different as it can be easily brought up to date. He estimates the historical reproduction cost as of Dec. 31, 1926, for the company and its suburban subsidiaries at $30,803,280. He then deducts 30 per cent for depreciation, which brings this figure to $21,562,296, from which he says a paving item of $2,955,019 could properly be deducted, as it would belong to the city on the expiration of the franchises.

The report gives a list of the outstanding securities of the Market Street Railway on Dec. 31, 1926, with the par value, which was $43,821,450; their market price, five-year average, which was $21,966,581, and their market price, 1926 average, which was $19,622,834.

The report also mentions another method of valuing the property, i.e., on its earning basis. The average yearly income during the past five years was $1,537,224. This sum, capitalized at 7 per cent, would call for a value of $21,960,343.

The city engineer in 1921 also made a valuation of the property, using as a basis the detailed inventory which the commission's engineer has prepared, but brought up to date. The unit prices applied to this inventory were averages for the five-year period from 1913 to 1917. This, in the main, Dr. Wilcox says, meant pre-war prices, modified to some extent by the upward trend of the last two years of that period. On this basis the city engineer obtained a reproduction cost new value of $35,273,442. On the basis of a 75 per cent condition, i.e., a deduction of 25 per cent for depreciation, the value became $26,366,366. This historical reproduction cost figure as brought up to date by Dr. Wilcox by additions to capital, but with 30 per cent allowed for depreciation, becomes $25,909,421.

In 1920, when the city engineer (Mr. O'Shaughnessy) valued the property, he reported to the Mayor and Board of Supervisors that a conservative estimate of the reproduction cost of the property, less depreciation, was not less than $35,000,000, and gave $40,000,000 as a fair price for the city to pay for all of the properties, including the suburban lines. Dr. Wilcox thinks that subsequent events, such as decrease in the rate of traffic development expected, increase in operating expenses and continuance of the 5-cent fare, have had the effect of eliminating all franchise value from the picture. Material prices are also much lower than in 1920, but labor costs are not less. Based on comparisons between historical reproduction new in 1921 and reproduction costs new in 1927, as determined in Los Angeles, Dr. Wilcox estimates the Jan. 1, 1927, reproduction costs new of the Market Street Railway property at $44,756,188. With a deduction of 30 per cent for depreciation, this figure would become $31,329,322.

Dr. Wilcox finds the system, as street railways go, a good property and maintained in good operating condition, but containing considerable "deadwood." By this he means a number of poorly paying lines, kept in service for one reason or another. If the city should take over the property, he thinks it would be a mistake to retain many of these lines in operation.

Last year the Market Street Railway carried 198,030,769 revenue passengers, slightly fewer than in 1925, but more than in 1924, and 6,000,000 more than in 1922, the first full year of operation after the company acquired the properties of its predecessor, the United Railroads. It is paying interest on about $12,000,000 of bonds, but has paid no dividends since 1923. In the opinion of Dr. Wilcox, the company apparently could go on operating as at present under a 5-cent fare and still maintain its solvency for an indefinite period, provided it could hold its wage rate at the present level and its present traffic against the inroads of the municipal railway competition, and could continue its present policy of building no extensions. But if it paid the wages that the municipal lines pay, he thinks its operations would immediately show a deficit before charges.

The testimony of Dr. Wilcox on what the municipal road has done under a 5-cent fare is particularly interesting. The first unit of the municipal railway was placed in operation Dec. 28, 1912. The system now embraces 64.55 miles of track in sole ownership and operation, 5.15 miles of track operated and jointly owned with the Market Street Railway and 4.42 miles of spurs and carhouse track. It owns 224 passenger cars and nineteen buses.

Its total fixed property investment as of June 30, 1927, was $8,969,134, representing the actual cost new of the property, exclusive of materials, supplies and other current assets. Of this amount $300,000 represents funds contributed from taxes and the payment of interest, election and other costs, incidental to the launching of the enterprise. For the balance of the investment, about $8,670,000, the system is now indebted in the amount of $3,295,000 of bonds outstanding. Some of the rest of the original costs have been provided from the earnings, either through original construction or through the subsequent amortization of bond issues. The amount actually provided for accrued depreciation is $3,117,536; of this amount $82,405 has been used for retirements, the balance for new construction.

During the 14½ years of existence its operating revenue and interest income has amounted in the aggregate to $36,088,461. After the deduction of operating expenses and bond interest charges the actual surplus left is $2,834,939. This figure does not include any allowance for taxes, though the city is required by charter to set up for the system "comparison charges" for taxes it is not required to pay, but would have been paid if the system had been operated by a private corporation. These charges amount during the period in question to $3,148,672. With this item charged against earnings the nominal deficit of the municipal railway would be $313,733 for the 14½ years. The author says: "No competent investigator, not blinded by prejudice, could deny that the Municipal Railway of San Francisco has achieved notable financial success under the 5-cent fare. If the municipal railway had been less favorably managed in the past and now had to pay interest on a debt equal to the cost of the property, less the depreciation provided, its interest charges for the last fiscal year would have been $113,000 greater than they were. Also, the municipal railway has increased the wages of its employees, giving them an annual two weeks vacation with pay and provided for employees' pensions, until it can no longer be said that street railway men under the standard established by the city of San Francisco are being exploited either for the sake of profits or in the interest of maintaining a low fare for the benefit of car riders." He thinks, however, that only by substantial economics in the future can this wage scale and the 5-cent fare be retained on the municipal railway and suggests that future amortization of capital be cared for by a special tax on land benefited by good transportation service.

Recommends Cash Offers for Both Lines

Dr. Wilcox's recommendation for the California Street Cable Railroad is that it should be notified that the city will not renew its franchises beyond their expiration date of Feb. 17, 1929, but will give the company $1,000,000 for its operative property, "or in the alternative, the estimated actual cost of the existing units of useful and necessary property other than land, less the depreciation accrued therein from all causes, to be determined by the Railroad Commission as the historical reproduction cost of the structural property, less de-

preciation, exclusive of paving, plus the present market value of the land at Hyde and California Streets, as fixed by the Stafford appraisal."

For the Market Street Railway, he recommends the city notify that company that it will not renew any of its franchises when they expire, and that after Sept. 20, 1929, it will not permit continued operation by the company of the lines on which its franchises have expired. This company should be offered $20,000,000 for its operative property, within the city and county of San Francisco, including lines under lease and controlled through stock ownership, "or in the alternative, the estimated actual cost of the existing units of useful and necessary property other than land, less the depreciation accrued therein from all causes, to be determined by the Railroad Commission as the historical reproduction cost method" with deductions and additions as in the previous case. If the company declines to accept either of these alternatives, the city, subject to the approval of the voters, would require the companies to cease operation on the sections whose franchises have expired and to remove its tracks. The city would then take immediate steps to build extensions of the municipal railway on those routes where the city wished operation continued. It would also acquire joint interest on all track still owned by the company, under unexpired franchises, on streets chosen for extensions of the municipal railway.

W., B. & A. Electric Railroad Conducts Prize Quiz

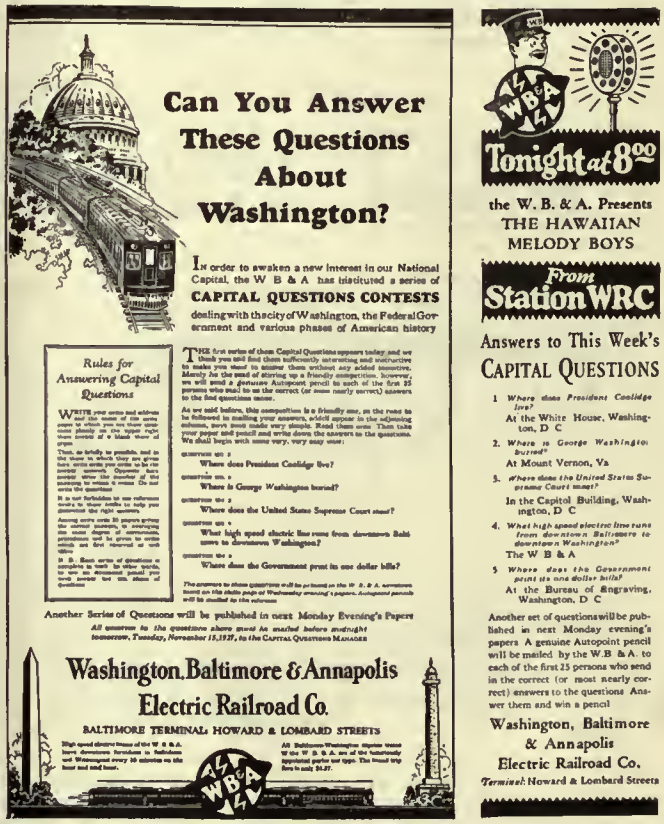
By H. T. Connolly
General Manager Washington, Baltimore & Annapolis Railroad Baltimore, Md.

ONCE more the Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md., has hit on a novel way of calling attention to itself and its services. The W., B. & A.'s latest idea is to arouse among the people of Baltimore an interest in the various show places of Washington (40 miles distant) by the simple device of asking questions and by offering a few prizes for correct answers. The prizes are modest; they are enameled, metallic pencils. The railway's advertisements have stressed the prizes as little as possible.

The aim is not so much to inspire an increase of tourist traffic from Baltimore to Washington as to associate the ideas of Washington and the W., B. & A. in the minds of all who read the advertisements. This is important, because the road is in active competition for passengers with two steam railroads and a motor coach line.

The questions appear in series of five. The first appeared in the Baltimore evening newspapers of Nov. 14. Simultaneously a letter was sent to school teachers asking them to call the attention of their history and civics classes to the contest. All the questions were as simple and easy as it was possible to make them. All but one suggested some place in Washington worth visiting and that one suggested the means of doing it. Where does President Coolidge live? Where is George Washington buried? Where does the United States Supreme Court meet? Where does the government print its one dollar bills? What high-speed electric line runs from down-town Baltimore to down-town Washington?

A few minutes after the earliest editions of the newspapers had appeared the first set of answers was delivered by the contestant in person. The next day's mail brought more than 500 answers. It had been anticipated that nearly all would be from school children, but a remarkably large number were from adults. It had also been anticipated that the great majority would answer all five questions correctly and notice had been given that, since only 25 pencils were available for distribution, priority would be given to the papers received in the first mail. But though the number of correct papers was well above 25, many others were amusingly inaccurate. It was very significant, however, that all



W., B. & A. advertising in Baltimore papers gave the questions and two days later the answers to the queries along with the regular radio program

knew how to get to Washington by electric train, though, to be sure, this information had been given gratis in the signature of the advertisement.

As far as could be determined, the contestants represented a wide variety of ages, intelligence and social grades. All papers were acknowledged and those who failed to win were invited to try again. To the winners the company sent with the prizes short letters of congratulation. The correct answers were published two days later, concurrently with the program of a radio concert to be broadcast that evening by the W., B. & A. from the Washington station, WRC, in a weekly series which has been conducted for several months with excellent effect. On Wednesday evenings they have been providing homes within reach of station WRC with 30-minute musical performances by the best talent available. Between numbers, the announcer calls attention to one or another advantage of the W., B. & A. service.

The second series of questions was published in the newspapers of Nov. 21. This time the questions concerned the National Zoo, the Library of Congress and the new National Cathedral. Although at the time of writing the returns from this second advertisement had not been tabulated, it was apparent that interest had increased rather than diminished.



1



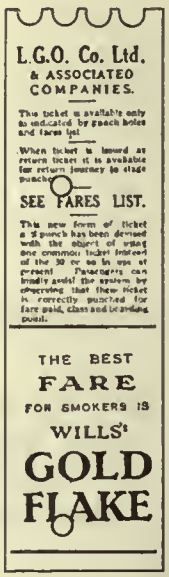
2



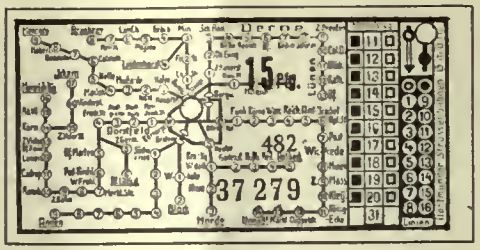
3



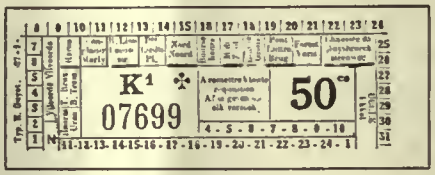
4



5



6



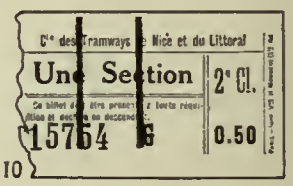
7



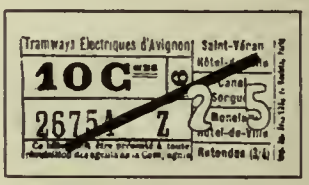
8



9



10



11



12



13



14



15



16

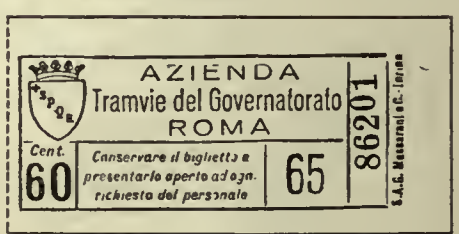
Fronts and backs of various European tickets or fare receipts

In the group above, Nos. 1 to 5 and Nos. 13 to 16 show the backs of tickets, and the others the fronts. The backs, on many European lines, are sold for advertising. No. 1 is from Nice, Nos. 2, 5, 13 and 16 from London, 3 is from Amsterdam, 4 is from Brussels, 14 is from Lido, and 15 from Milan. As will be seen the articles advertised are varied, including clothes, candy, tobacco, furniture, beer, and medicine for the baby. Fronts of tickets are shown as follows: 6 from Dortmund, Germany, 7 from Brussels, 8 from Naples, 9 and 10 from Nice, 11 from Avignon, and 12 from Milan. Especially interesting features in these tickets shown are as follows: In 6, the map of the system for easy punch of destination; in 7, the printing of all names in two languages, French and Flemish; in 9, the issue of a "supplement," or extra fare, when a passenger changes from second to first class, and 11, a surcharged ticket, showing an increase in fare from 10 to 25 centimes.

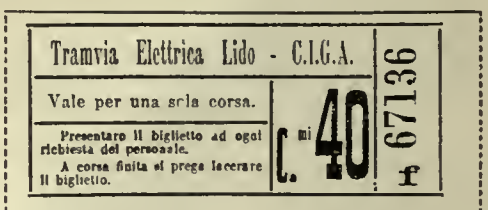


1











The lower group shows other European street railway tickets or fare receipts. In this group only the fronts of the tickets are shown.

It will be noticed that the rate of fare is distinctly printed on the face of the ticket. Those in the left hand column are from Amsterdam, Lugano, and Milan. That above, in the center, is from Florence. Those in the right hand column are from Rome, Lido, and The Hague.



Fares and Fare Collection

in Europe

Some lines charge zone fares, others flat fares. The fare receipt is common, but fare boxes are used on one-man cars. London County Council is pioneering in mid-day fare reductions

By Henry W. Blake
Senior Editor *Electric Railway Journal*



Berlin commutation tickets

Many of the street railway lines in Europe sell tickets for any number of rides within a specified period, good either over the entire system or only over certain routes. The two reproductions in the center are front and back of a monthly commutation ticket, good over the elevated and underground railway and also the surface lines in Berlin. Payments are made monthly for six months, and their receipt is shown by stamps pasted over the squares on the back and canceled. The ticket at the left is sold at a reduced price to students. That at the right is for the surface lines only. All of these tickets require the photograph and signature of the person to whom issued; that is, they are non-transferable. The word "Muster" simply means "sample."

ELECTRIC railway and bus fares are lower in the large cities in western Europe than in the United States, but as a rule the average ride is much shorter than here, and no transfers are given. Berlin is an exception to this rule about transfers, as it gives one transfer for its flat 5-cent fare and puts a time limit on the trip. It should also be remembered that the labor costs of electric railway and bus operation are much lower in Europe than in America. Particulars on this point were given in an article by the writer in ELECTRIC RAILWAY JOURNAL for Aug. 27.

Practice in European street railway and bus fares divides between the zone fare and the flat fare. A report presented at the 1924 convention of the Internationaler Strassen- und Kleinbahn Verein and published in abstract in the issue of this paper for Nov. 29, 1924, showed that on the 47 city roads of Central Europe which reported 22 had flat fares and 25 some form of zone fare.

The same variation is found in the largest cities. Thus, all lines in London, the bus and surface railway lines in Paris and the surface lines in Brussels charge fares on the zone system, but the rapid transit lines in Paris, all lines in Berlin, the railway and bus lines in Milan, Florence and Rome and the trolley in Amsterdam charge a flat fare. The flat fare rate in the spring of this year in the cities mentioned, expressed approximately in American currency, follows: Berlin, 5 cents; Amsterdam, 4 cents; Milan and Florence, 2½ cents; Paris rapid transit lines, 2.4 cents for second class and 4 cents for first class; Rome, on most lines, 2½ cents on weekdays and 3 cents on Sundays, but on two long lines, 4 cents on weekdays and 4½ cents on Sundays.

Under a recent agreement made in Berlin between the city of Berlin and the State Railway System a flat fare will be established between the Berlin Stadtbahn system on one hand and the rapid transit, street railway and bus system on the other. The Stadtbahn, as will be remembered in an article which was published in this journal in the issues of Nov. 5 and Nov. 26, is a part of the State Railway System, on which considerable local transit business is done. It is now being electrically equipped for 800-volt d.c. operation. On the payment of a flat 30-pfennig fare, passengers will receive a free transfer from

the Stadtbahn or Ringbahn or from any section of the suburban lines (or Vorortbahnen) to any one of the municipally owned lines mentioned. Later, a half-fare rate for children may be introduced.

The minimum fare per zone for surface lines charging zone fares often varies, as shown in the table on page 1069, reproduced from the posted notice of the Vitry-Concorde line in Paris, being sometimes 35 centimes and sometimes 50 centimes (50 centimes = 2 cents). The same schedule also shows higher rates for first class passengers, a special fare schedule for workmen's return tickets and two schedules for cripples, depending on the extent of their injuries. "Cripples" (*mutilés*) as used here means primarily soldiers crippled during the war. Each car carries a table of this kind, applying to the points reached.

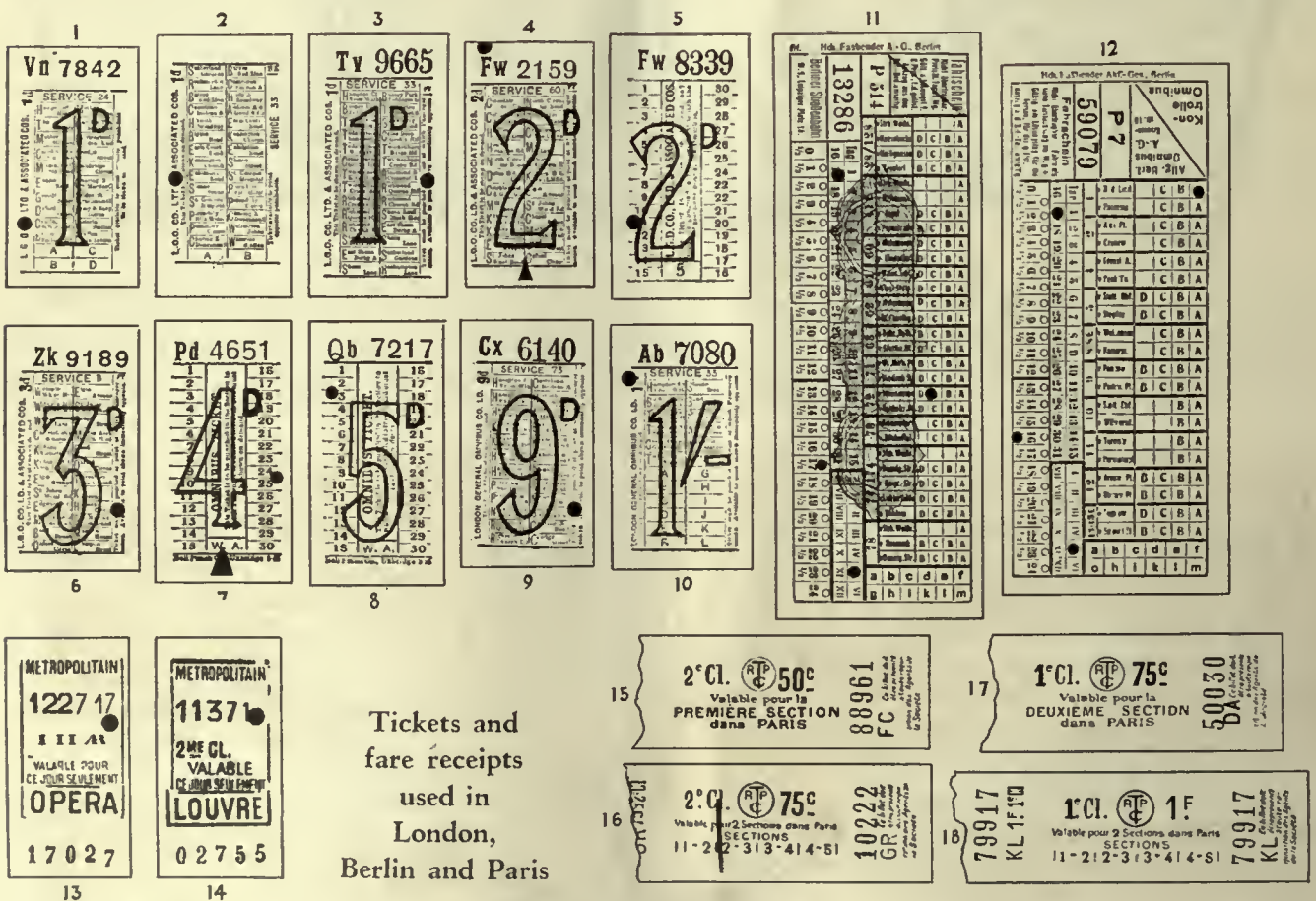
On the Paris bus lines the fare in the first zone is usually 2 cents for second class and 3 cents for first class, with 3 cents and 4 cents respectively for two zones and 4 and 5 cents for more than two zones. The Paris bus lines also have reduced rates for the same classes favored with lower rates by the surface lines.

All Paris trolley and bus fares are based on a higher charge for the initial zone than for each succeeding zone. In London, however, the trolley and bus fares are directly proportional to the distance traveled, so far as this can be done with the policy followed of having the zones end at logical traffic points. These London fares are approximately a penny for about 1¼ miles on the London County Council tramway lines and a penny a mile for the buses.

In addition, the London County Council Tramways has had in force also for several years reduced flat fares, particularly in the middle of the day. Thus, it sells from Monday to Friday for 2 pence a ticket which is good for any distance and is accepted on cars which leave their London (or downtown) termini between 9:30 a.m. and 4 p.m. and on those which arrive at the downtown termini between 10:30 a.m. and 5 p.m. In other words, these time limits are so set as to give the greatest leeway when the passenger goes against the main trend of travel. This 2-penny fare accounts for about 5 per cent of the daily revenue. It is now proposed to sell these tickets on Sunday also.

Other Bargain Fares in London

The London County Council also issues a 1-shilling day pass, good on any day. Originally, this pass was issued on Saturdays and Sundays only, but its use was extended to every day during 1925. On a recent bank holiday 20,000 of these passes were issued at 1 shilling each, making the receipts from this pass amount to approximately 6 per cent of the total receipts, which were about £16,000. Within the last few months the County



Tickets and fare receipts used in London, Berlin and Paris

Tickets from 1 to 10 are reproductions of fronts and backs of tickets issued by the London General Omnibus Company. They represent trips for which charges are made varying from one penny to 1 shilling. As a rule the zone points are named on the ticket, being arranged in double column in such an order that one punch indicates both termini. Sometimes letters or numbers only are used, especially where a large number of zone points would have to be listed.

No. 11 shows a combined fare receipt and transfer ticket issued by the Berlin Surface Lines. It is punched for the day, hour and issuing route. The letters in the lower right hand corner are punched by the conductor of the car to which transfer is made. No. 12 is a corresponding ticket issued by the Berlin General Omnibus Company.

Nos. 13 and 14 are tickets issued by the Metropolitan (rapid transit) Railway in Paris. They are issued by a machine and carry the hour and day of issue, class and name of issuing station. Though a flat fare is charged in each class, tickets are employed to identify the class used.

Nos. 15 and 16 are second-class tickets, one for one section, and one for two sections, issued by the S.T.C.R.P., which operates the surface cars and buses in Paris. Nos. 17 and 18 are the same, but are good for first-class accommodations.

Council Tramways has been issuing a similar pass for children at half price, or 6 pence, but the pass is limited to the four months from June to September.

Besides these fares, the L.C.C., like most of the other tramways in Europe, issues a workingman's ticket. This ticket, which is sold to any one who applies for it on the cars before 8 a.m., is a round-trip ticket good for return at any time during the day, for the price of a single fare. On the London County Council lines there is a minimum charge for this ticket of 2 pence. Then there is the ordinary return fare ticket, good on certain lines and sold at the rate of 5 pence for two single 3-penny rides; 6 pence for two 4-penny rides and 8 pence for two single 5-penny rides. There are in addition to the 2-penny flat-fare mid-day tickets the 1-shilling transferable one-day pass and the 6-penny children's one-day pass already mentioned. The London County Council management has been very successful in merchandising these different rates of fare and has tickets to fit practically each combination desired.

As explained, the London single car fare of 1¼ miles for a penny is somewhat less than the London bus fare, which is based on a mile for a penny. Elsewhere in Europe, also, the trolley fare usually is somewhat less than the bus fare, or else for the same fare a longer ride is given by trolley than by bus. Berlin is an exception, the same flat fare (20 pfennigs) being charged on bus, trolley and rapid transit lines with liberal transfer arrangements, but electric railway operation is considered less expensive there than bus operation and the trolley lines are paying a good profit. The large surplus from Berlin trolley operation is used to finance the construction of the rapid transit lines, as both are owned by the municipality.

Incidentally, it might be added that in every city visited by the writer during a recent trip on the Continent, where the bus system and trolley system were operated by the same interests, the trolley was pronounced by the management the more economical per passenger carried and better suited for mass transportation.

Most European electric railways issue season tickets or passes for one week, one month, three months, six months, or (as in Zurich) for a year. These tickets are not transferable like our weekly passes, but can be used only by the person whose name (and sometimes photograph) appears on the card. The charge for these season tickets varies with the number of routes over which they are available. An extended account of the varieties of tickets of this kind sold by the roads in Central Europe will be found in the article already mentioned on page 924 of the issue of this paper for Nov. 29, 1924. Where such commutation tickets are issued the road also usually sells a school commutation ticket at a lower price. Some Berlin monthly school tickets are reproduced. A permit card is also issued to scholars between fourteen and eighteen years old, allowing them to ride at the children's rate.



Advertisement on the back of the tickets of one of the bus lines running out of Monte Carlo

Fare Collection

The almost universal method of fare collection on both street railways and buses is for the conductor to make a trip through the car after each stop and collect fares by hand from the passengers who boarded the car. For each fare collected he issues a receipt, torn serially from a pad, of which the conductor carries several, one for each rate of fare and direction. The conductor's accounts are audited by the number of tickets remaining in the pads issued to him when he started his work.

Where there are many rates of fare, as on a number of the London bus lines where the fares may range by half-penny gradations from a penny to a shilling, the



British managers advertise bargain rates on their cars

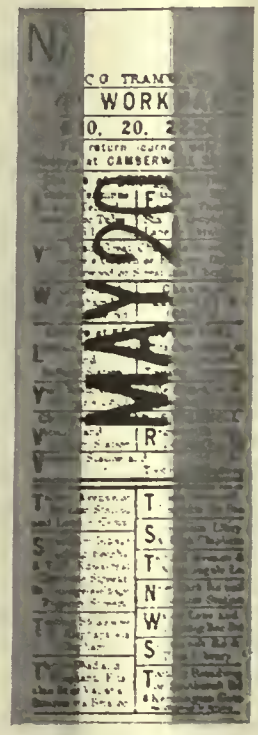
The paster at the left tells about the new rate brought out by the London County Council, i.e., a 6d. daily pass for children. The paster at the right advertises the flat 2d. fare good for any distance during the middle of the day on weekdays on the London County Council Tramways.



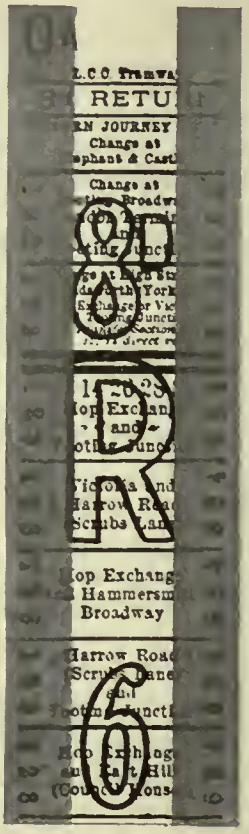
1



2



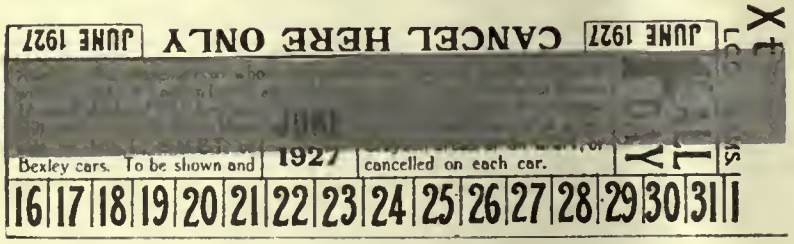
3



4



5



6



7

Special Tickets of London County Council Tramways

Regular fares on the London County Council Tramways are on the zone system, with a charge of approximately 1d. (2 cents) for 1¼ miles. A number of special cut-rate tickets are issued, however, for various kinds of journeys. Several are illustrated above.

The first (No. 1) is a 6d. return ticket, good at any time during the day for a ride where the single fare would be 4d. The procedure on these lines for the issue and cancellation of return tickets is, briefly, with the exception of emergency tickets, as follows:

At time of issue, if the journey can be made without a transfer, the destination is punched in the lower part of the ticket below the double line. If the journey requires a transfer, the issuing conductor punches the transfer point above the double line, while the conductor on the second car, if it will take the passenger to his destination, punches the ticket below the double line on the same edge of the ticket as the cancellation of the first conductor. In other words, one cancellation below the double line indicates the ticket has been presented to the conductor on a car which will take the passenger to his destination on his outgoing trip.

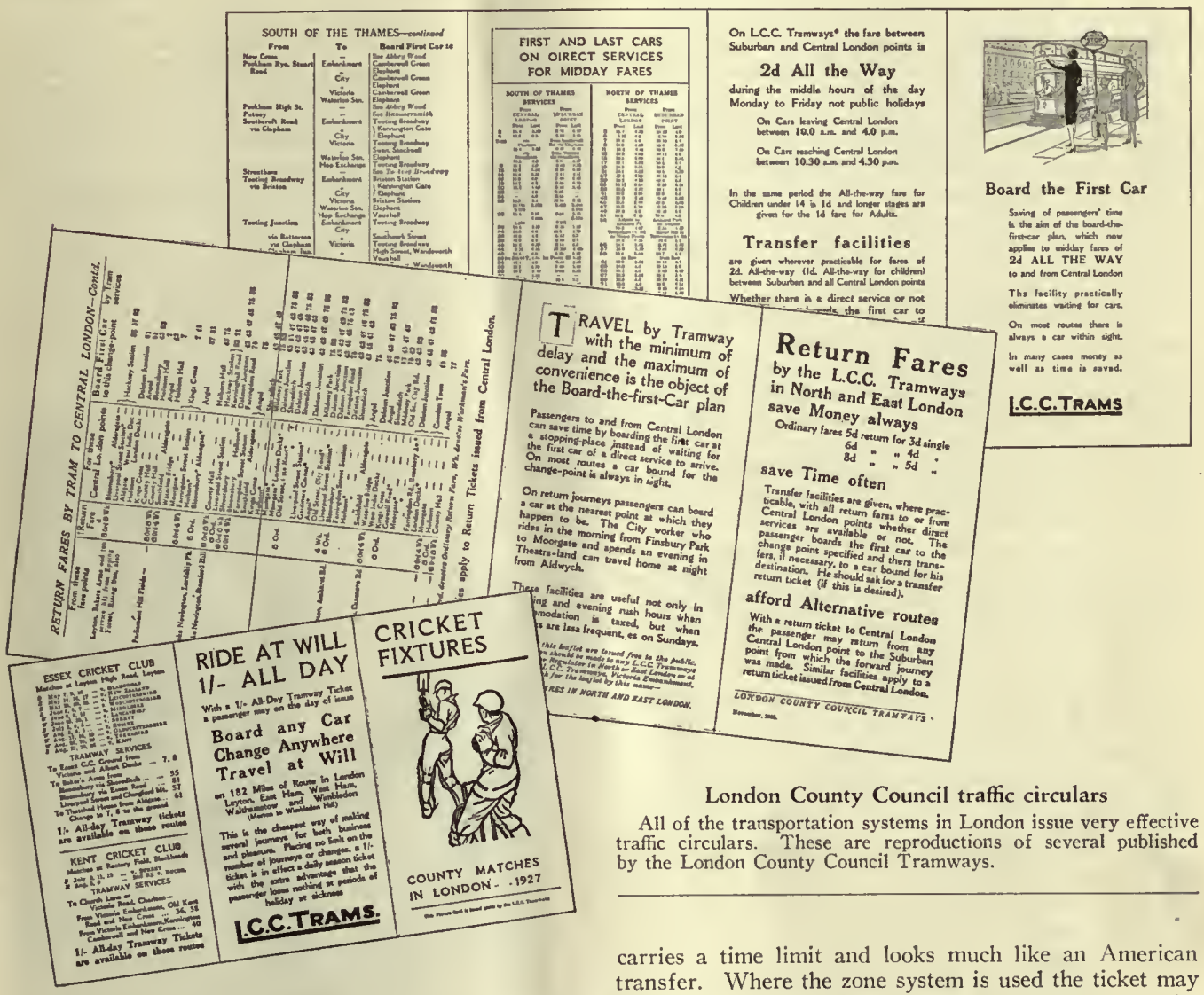
The practice described is followed on the return trip, namely, for direct journeys cancellation is made below the double line and transfer journeys above the double line, with final punch below the double line made by the conductor on the last car used. Two punches below the double line mean cancellation of the ticket. The date is punched in the margin, in the space provided for it.

Ticket No. 2 is the famous 2d. flat midday fare. This ticket is good for any distance on cars leaving central London between 9:30 a.m. and 4 p.m. or on cars reaching central London between 10:30 a.m. and 5 p.m. Transfers are permitted and the same system is followed as with the No. 1 ticket, the conductor on the final car punching the ticket below the double line.

Ticket No. 3 is a 4d. workman's return ticket, not greatly different in form from the 6d. return ticket already described, but sold at a reduced rate because the going trip is taken before 8 a.m.

Tickets Nos. 4 and 5 are respectively 8d. and 6d. return tickets of a somewhat different type than the ones already shown, particularly in the method of indicating the date of issue. They are printed for six consecutive week days, the day of the month being punched by the conductor.

Nos. 6 and 7 are front and back of the 1s. all-day pass. These passes are printed good for one-half a month, and the day of issue is punched in one margin. Every time the pass is used, the conductor makes a punch in the canceling margin. The back of the ticket shows the routes over which the ticket is available. These include not only all the lines of the London County Council, but by agreement with certain connecting municipal lines it is good over those lines also.



London County Council traffic circulars

All of the transportation systems in London issue very effective traffic circulars. These are reproductions of several published by the London County Council Tramways.

number of pads of tickets which a conductor has to carry is quite large. The supply of these tickets which is required in the stockrooms of the company is correspondingly large. Sometimes the number carried by the conductor is reduced by having him punch the rate, but as another alternative the London General Omnibus Company is trying on one line a ticket-issuing machine. It is swung around the neck of the conductor, just as the customary bell punch is carried. It weighs 4 lb. instead of 2 lb. for the punch.

Often the space on the back of the ticket (or fare receipt) is sold for advertising purposes, thereby bringing in a considerable revenue. The aptness of some of this advertising is illustrated by the reproduction of the back of the bus ticket between Nice and Monte Carlo. It shows a man whose pockets are empty, but whose woman companion says that the pawnbroker Maxima "will advance us some more money on our jewelry."

Every passenger by train or bus is expected to get a receipt for the fare paid by him and to hold it until he finishes his trip. Inspectors occasionally board the car or bus to see that all passengers have fare receipts. When the passenger leaves the car he may throw his receipt away, either on the car floor or on the street.

The form of this kind of receipt is very simple on flat-fare lines which give no transfers, as will be seen from the Italian tickets reproduced. Where a transfer is permitted for the fare paid, as in Berlin, the ticket carries a time limit and looks much like an American transfer. Where the zone system is used the ticket may indicate by type the point to which fare has been paid, as in London and Brussels, or by a map of the system, as in Dortmund, or it may simply carry the words that it covers a certain section or number of sections, as in Paris.

The London General Omnibus Company follows an ingenious method of arranging the names of the different zone limits on its fare receipts so that the conductor indicates both the boarding point and the point to which fare has been paid by a single cancellation. Sometimes the punches used are of the magazine type so as to give another check on the number of tickets issued by the conductor.

A feature of every ticket sold, and this applies to steam railroad tickets in Europe as well, is that it carries distinctly on its face the price at which it is sold. This is usually printed, but occasionally may be punched. This is undoubtedly a great convenience to the traveler and a plan which steam railroads here could copy to advantage. A few railroads print the price on the ticket, as does the Pullman Company, but except for these the purchaser of a railroad ticket in the United States can never be sure that he is not being short-changed, unless he knows the proper charge for his ticket or goes to the trouble of looking it up.

The one-man cars in Amsterdam were the only ones seen by the writer on his recent trip which were equipped with fare boxes.

The rapid transit lines follow the same practice of

issuing fare receipts, except that where a zone fare is charged the passenger on leaving the station surrenders his ticket to a station guard, who thereby can check him to see that he has not overridden.

On the flat-fare Paris rapid transit lines tickets are not necessary for this purpose, but are issued to indicate whether the fare paid entitles the passenger to ride in a first-class or second-class car. Ticket-issuing machines are employed, and different colors indicate the two classes. Each ticket is stamped with the time it was issued as well as the name of the issuing station, so it cannot be used a second time.

As there need be no check on overriding on this flat-fare line, the Paris rapid transit passenger is not obliged to surrender his ticket at the end of his trip, but to prevent the stations from being littered with tickets wire baskets are provided near the entrances, into which those leaving the station can throw their used tickets if they wish to. Occasionally baskets of this kind will be seen at important unloading points on surface lines, but they are not common.

On the Berlin rapid transit lines, as explained, the fare receipt issued is very similar in appearance to that used on the Berlin bus and street railway lines. In May of this year, however, the company was experimenting with several ticket-issuing machines.

On the zone fare rapid transit lines in London each ticket not only names the station on the direct line to which the passenger may ride for the fare paid, but also names all the limiting stations on all the connecting lines to which the fare paid entitles the passenger to ride. On a 6-penny ticket this means a larger number of stations.

Most of the London rapid transit stations are equipped with "penny-in-the slot" ticket-issuing machines, from which passengers with the exact change can secure the ticket they want. Thus one machine will issue 1½-penny tickets, another a 2-penny ticket, etc.

Reason for Issue of Fare Receipts

It may appear strange to Americans that European flat-fare lines continue to use a system such as the fare receipt, which has several conspicuous disadvantages as compared with the fare box. One of these is the expense of printing the receipts, though this is sometimes covered, as explained, by the sale of advertising space on the back. Another objection is the expense of inspectors. Another is the litter in the car and on the street caused by discarded tickets. It will appear also to most American managers that the system is slower and more open to abuse by both passengers and conductors than the fare box, though European managers deny this to be the case on their roads.

For zone fare lines there are certain advantages which call for the retention of the fare receipt, as it does afford a definite way of indicating the point where a passenger boards the car or bus and the distance which he is entitled to ride. This is especially useful where the fare zones are short, as they are in Europe.

Probably the main reason for the use of the fare receipt on flat-fare lines is that the public is accustomed to it, both because many of these flat-fare lines formerly charged zone fares and because the fare receipt is in general use in neighboring cities. However, it is not very practicable with one-man car operation, and if that method should spread in Europe the fare box would undoubtedly be more widely adopted. Already the managements of some flat-fare lines are considering the fare box seriously.

As will be seen, the fare system in Europe is by no means standardized. Beside it the straight fare charged in most American cities is simplicity itself. In Europe each system seems to have worked out its fare system independently. Part of the variation is due to law. The low workmen's fare in most cities is an instance. Part can be attributed to compromises made with the city authorities when permission for an increase in fare was obtained. Part has been caused by the spur of competition. In London this competition has been between the city-owned trolley cars on one side and the privately owned buses and rapid transit lines on the other. In all the cut rates put in, however, the great traffic advantage has been sought of giving the reduced rate, so far as possible, only during the non-rush hours or in the direction contrary to the main flow of traffic.



Keeping passengers in line

In Paris a box containing a pad of tickets for queue formation in boarding cars or buses is attached to this standard, upon which is also a stop sign for street cars and buses. A sample queue ticket is shown in the lower left-hand corner.

In America the principal, indeed the only, competitors ever considered are the jitney and the privately owned automobile. Neither of these is a serious factor in Europe, owing to the small proportion of the population which owns cars. It is another matter, however, with bicycles. Especially on the continent of Europe bicycles are a very common sight on city streets, but perhaps more so in Italy and Holland than in France, Germany or Belgium. It is said that in Amsterdam, which is a city of 800,000 inhabitants, there are 200,000 bicycles, and any one who sees them crowd the streets in the downtown



SECTIONS ET TARIFS

De VITRY (Église) à :	1re Cl.	2e Cl.	Ouvriers aller et retour	Bataillons	MUTILÉS 100 %
VITRY (Gare)	0 50	0 35	0 50	0 35	0 30
IVRY (Place Gambetta)	0 75	0 50	0 60	0 35	0 30
PORTE DE LA GARE	1 10	0 85	0 85	0 70	0 30
PONT D'AUSTERLITZ	1 85	1 35	1 45	1 05	0 85
SAINT-GERMAIN-DES-PRÉS	2 10	1 60	1 70	1 05	0 65
PLACE DE LA CONCORDE	2 35	1 85	1 85	1 20	0 80
De VITRY (Gare) à :					
IVRY (Place Gambetta)	0 50	0 35	0 50	0 35	0 30
PORTE DE LA GARE	0 75	0 80	0 75	0 50	0 30
PONT D'AUSTERLITZ	1 50	1 10	1 25	0 85	0 65
SAINT GERMAIN DES PRÉS	1 75	1 35	1 50	0 85	0 6.
PLACE DE LA CONCORDE	2 »	1 60	1 75	1 »	0 80

D'IVRY (Place Gambetta) à :	1re Cl.	2e Cl.	Ouvriers aller et retour	Bataillons	MUTILÉS 100 %
PORTE DE LA GARE	0 50	0 35	0 50	0 35	0 30
PONT D'AUSTERLITZ	1 25	0 85	1 »	0 70	0 85
SAINT GERMAIN DES PRÉS	1 60	1 10	1 25	0 70	0 65
PLACE DE LA CONCORDE	1 76	1 35	1 60	0 85	0 80
De la PORTE DE LA GARE à :					
PONT D'AUSTERLITZ	0 75	0 50	0 60	0 35	0 35
SAINT GERMAIN DES PRÉS	1 »	0 75	0 85	0 35	0 35
PLACE DE LA CONCORDE	1 35	1 »	1 »	0 50	0 50
Du PONT D'AUSTERLITZ à :					
SAINT GERMAIN DES PRÉS	0 75	0 50	0 60	0 35	0 35
PLACE DE LA CONCORDE	1 »	0 75	0 85	0 35	0 36
De St-GERMAIN-DES-PRÉS à :					
PLACE DE LA CONCORDE	0 75	0 50	0 60	0 35	0 35

Tables of this kind are posted in all Paris cars

They vary according to the route traversed, showing the fares between different zone points. Notice the difference in fares between regular passengers, workmen, cripples and completely disabled soldiers. The workmen's fares quoted are for a round trip.

section between 8:30 and 9 a.m. will have little difficulty in believing that such a high ratio is correct. In all the continental European capitals they form a serious competitor to the bus and electric car.

Tickets for Queue Formation in Paris

Before the subject of electric railway and bus tickets is dismissed a short reference should be made to the tickets for queue formation used in Paris. At the more important car and bus stopping points there is a pad containing numbers serially arranged, the pad usually being attached to the post carrying the sign which lists the lines passing that point. This pad is used by passengers only when the cars or buses passing that point are crowded and it is evident that only a limited number of additional passengers can be taken on at the next stop. At such times, as intending passengers arrive at the stopping point, each detaches a number from the pad. The passengers are then admitted to the car or bus in the order of their numbers, the lowest numbers coming first. The only exception to this rule of priority is the published regulation of the company which says:

"La priorité est laissée aux aveugles, mutilés de guerre femmes dans une position intéressante ou portant un enfant sur les bras."

Paris was the only city visited by the writer in which this queue system is in use. Even there some of the transportation officials were skeptical about its desirability, but they said it was continued because the public was accustomed to it. It has been employed there for many years, even during the days when buses and cars in Paris were drawn by horses. A queue ticket is reproduced on page 1068 and a pad of these tickets can be seen attached to the pole in the Paris stop sign, illustrated on the same page.

Operator's Nameplate Put on Fare Box

USE of a plate on cars, particularly one-man cars, giving the name of the operator is extending. The practice, of course, is followed also for the clerks serving the public at hotel desks, railroad ticket offices and elsewhere, the thought being that the public likes to know at least the name of the person with whom it is doing business.

Usually the name is painted on a strip of wood which fits into a slide inside the vestibule. The brief of the El Paso Electric Company, El Paso, Tex., presented for the 1927 Coffin Prize discloses that on its railway the name is carried on the fare box.

The nameplates are of brass with polished raised letters. They are about 1¾x6 in. long and fit into a special slot on the fare box. Thus the name of the operator is in plain view of all boarding passengers. A light placed over the slot makes the name visible at night.

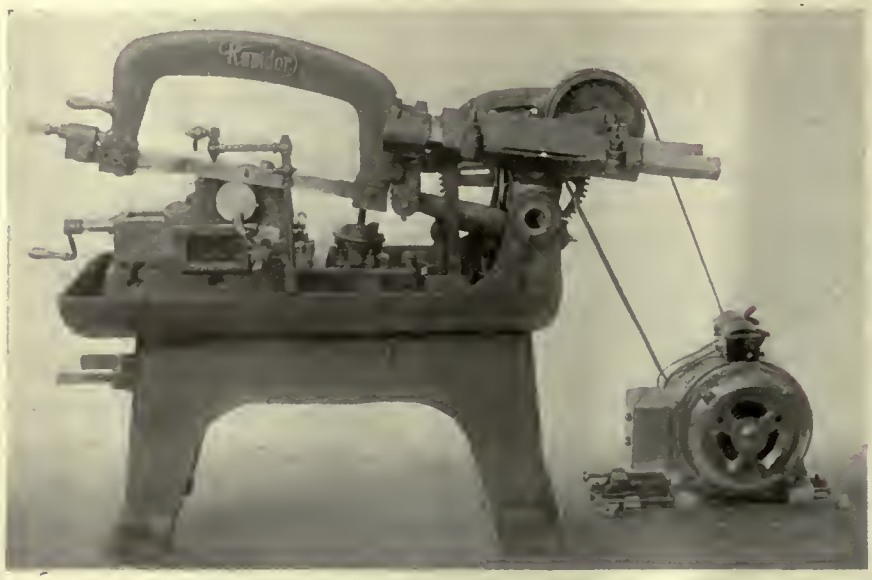
At first aluminum nameplates were used, but they were discarded in the summer of 1926 in favor of brass plates. It was found that aluminum was not durable enough to withstand the hard usage to which the nameplates are subjected. Being of metal, the plate is not so likely to be mutilated or become unsightly as if of wood, and the highly polished letters of the name can be read easily.

As it is attached to the fare box, the nameplate automatically is always carried at the front end of the car.



Loading platform in the down-town business district of Amsterdam

No traffic is in sight except the street cars and a bicycle. While this absence of street traffic is not a common condition, it is a fact that automobiles are much less in evidence in Amsterdam and other European capitals than in cities of corresponding size in the United States, and that the number of bicycles very much larger.



Heavy-duty sawing machine for use with high-speed saws

3-in. diameter mild steel bar in an average of three minutes and twenty seconds. When sawing 3-in. diameter brass bar under the same conditions 100 cuts can be made between sharpenings and the average time per cut is 45 seconds. These outputs are in advance of previous designs of hacksaw machines.

Quick operation is a particular feature of the new design. The saw blade is strained by turning a handle and a patent tension indicator shows when the blade is strained correctly. All operations and adjustments are controlled from one position in the front of the machine. On the three-speed machine the speed changes are made by a handle at the front.

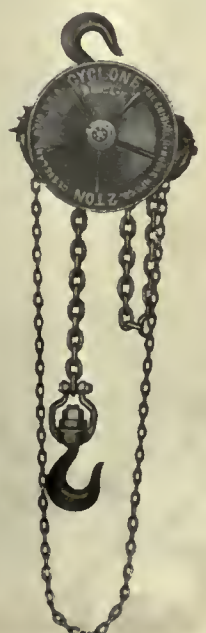
In operating the machine the pressure on the blade is not altered after adjustment. This is unnecessary, because when a blade is dulled, instead of adding pressure and forcing it to cut, it is taken out and resharpened. The vise, of the heavy-duty screw type, has a loose jaw which swivels for holding taper work. The screw is fitted with a ball thrust washer, which lessens the effort required from the operator when fixing work. A control device makes it possible to start on sharp corners without damage to the blade.

The new saw is made from machine-molded castings. Rotating shafts are ground to size and run in renewable phosphor bronze bearings. The main slides are adjustable for wear. The crank and frame pins are hardened and ground. Grease gun lubrication is used.

Motor-driven machines have speed-reducing gearing and the motor can be fixed on slide rails on the floor behind the machine. If portability is required the motor can be bolted to the body of the machine. All gearing is machine cut and guarded.

Long Life Feature of New Hoists

IMPROVEMENTS in the new Model K Cyclone hoist manufactured by the Chisholm-Moore Manufacturing Company, Cleveland, Ohio, include an increased efficiency of 90 per cent, as against 80 per cent of previous models. Particular attention has been given to providing a material and construction which will give long life. Among the changes is the addition of anti-friction bearings at every rotating point. Altogether eight ball bearings, four roller bearings and one Timken thrust roller bearing in the lower swivel hook are used.



New type of cyclone hoist

One of the most important changes is the use of four eccentric roller bearings. In previous models the rollers of these bearings were loose and had to be fitted carefully into their cage at the time of assembling. In the new model these roller bearings are built in one complete unit, which does away with loose rollers.

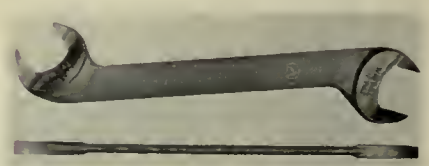
Another improvement includes the use of a new steel alloy of extreme hardness. This gives exceptionally clean and accurate chain pockets and reduces the wear at that point. All parts are made interchangeable, so it is possible to assemble them in the hoist quickly without regard to rights or lefts. Center punch marks or other generally accepted means for indicating the correct position are not necessary.

The entire mechanism is inclosed in a dustproof, oil-tight frame. This feature makes possible a minimum of attention for the hoist as it needs only to be packed with grease once a year under ordinary use. The hoist being exceedingly light, it is possible to carry it easily from one job to another. Exceptional efficiency is a feature.

Your weak and run-down armatures say "for heaven's sake" treat me to a "dip and bake."

Thin Wrench for Brake Adjustment

HEADS of but $\frac{7}{32}$ in. in thickness feature a chrome-vanadium wrench announced by the Bonney Forge & Tool Works, Allentown, Pa. The extreme thinness makes the wrench easier to use in adjustment



New thin model wrench

of Lockheed brakes, the adjusting nuts of which are not readily accessible to ordinary wrenches.

The new wrench is a double-ender with $\frac{5}{8}$-in. opening at each end for the $\frac{7}{16}$ S.A.E. adjusting nuts. One opening is at $22\frac{1}{2}$ deg. and the other at 60 deg. to the handle.

Association Activities

Pennsylvanians Meet at Scranton

Well-attended meeting of Pennsylvania Street Railway Association is addressed by President Stevens of the A.E.R.A. and prominent railway men of the Keystone state

IMPROVEMENT in transportation service was the general subject discussed at the annual convention of the Pennsylvania Street Railway Association held Dec. 1 and 2 at Scranton. R. P. Stevens, president of the American Electric Railway Association, chose "Service" as the theme of an address made at the banquet Thursday evening. He stressed the extreme importance of maintaining good relations between the electric railway companies and the public. H. S. Metcalfe, assistant to the president West Penn Electric Company, talked along somewhat similar lines on the same occasion. Prior to the presentation of the addresses of the two principal speakers, Thomas Davies, secretary to Mayor E. B. Jermyn of Scranton, welcomed the convention delegates to the city.

The feature of the afternoon session was a discussion of traffic congestion and its causes by R. C. Haldeman, president Pennsylvania Motor Federation, who emphatically condemned automobile parking.

Another paper presented by W. T. Rossell, general manager Pittsburgh Railways, discussed the need for better organized supervisory methods on electric railway properties, while J. W. Shaw, Philadelphia Rapid Transit Company, spoke on co-ordinating all transportation facilities under a single management. These papers will appear in abstract in a future issue.

Developments in Car Design Discussed by Engineers

Recent improvements in car design were discussed in a talk by George Frey, assistant general sales manager J. G. Brill Company, Philadelphia, Pa. He described in detail the novel features of the Brill model 1928 car, which was exhibited at the Cleveland convention last October. His talk was illustrated with a number of views of this car and its mechanism. The double reduction gear drive on the model 1928 car was discussed by George Woods, railway engineer Westinghouse Electric & Manufacturing Company. He said that four objects had been sought in the design of this drive: First, faster acceleration; second, greater spring support; third, low floor height, and, fourth, quiet operation. In his opinion considerable success has attended the effort to accomplish these objects. J. C. Thirlwall, General Electric Company, called attention to the fact that these new designs are still in the experimental stage.

Many of the brickbats thrown at street railway companies were fully deserved, according to H. S. Metcalfe, assistant to the president West Penn Electric Company, speaking at the annual banquet. In their infancy and through their early years, he said, public utilities in general and street railways in particular developed habits that in many cases have grown with them. Even though there have been sincere attempts to discard the evils of yesterday, those records have not been and will not be forgotten. Franchise evils, the abuses of monopoly, watered stock, ancient equipment, a "public-be-damned" policy and irregular service are all blotches upon the record of street car companies.

Likening the street railway industry to a leopard, Mr. Metcalfe remarked that it is infinitely easier to get spots on than to get them off. However, many of the spots are fading away, he said, and there is a new appreciation of the necessity and worth of street railway service abroad today. A real desire to render true public service is foundational if the mistakes of the past are to be eradicated and this program must begin with the management of the street railway, be conveyed by it to the employee group and interpreted by both management and employees to the public.

Mr. Metcalfe stated that promises without performance are piffle and that all high-sounding statements made by street railway executives amount to nothing more than wind unless service and equipment adequate for every community are provided. In an attempt to change the leopard's spots in the street railway business a willingness to face facts with candor is needed, recognition must be given to the difficulties which arise from acute competition due to the private automobile, an honest endeavor must be made to meet existing conditions and overcome them, and through the whole program an optimism born of faith in future success must be manifested.

Reports of the secretary and treasurer and of the various committees were presented at the Friday morning session. New officers were elected and installed. A moving picture showing how automobile tires should be cared for was presented by the Firestone Tire & Rubber Company.

New Officers Elected

Officers chosen for the coming year are: President, H. L. Mitchell, president West Penn Railways; first vice-president, J. E. Wayne, vice-president and general manager York Railways; second vice-president, H. F. Dicke, vice-president Lehigh Valley Transit Company; secretary, H. A. Buch, Harrisburg; treasurer, C. F. Crane, assistant to the president Harrisburg Railways. The new executive committee will consist of Thomas Cooper, Westinghouse Electric & Manufacturing Company; C. F. Crane, Harrisburg Railways; S. S. Crane, Altoona & Logan Valley Electric Railway; H. H. Dartt, Scranton Railway; Thomas Fitzgerald, Pittsburgh Railways; A. R. Myers, Erie Railway, and W. A. Woolford, General Electric Company.

COMING MEETINGS OF *Electric Railway and Allied Associations*

Jan. 16-17—Midwest Electric Railway Association, Hot Springs, Ark.

Jan. 18-19—Kentucky Association of Public Utilities, annual meeting Brown Hotel, Louisville, Ky.

Jan. 18-19—Central Electric Traffic Association, Hotel Gibson, Cincinnati, Ohio.

Jan. 25—Central Electric Railway Master Mechanics' Association, Hotel Gibson, Cincinnati, Ohio.

Jan. 25-27—Electric Railway Association of Equipment Men, Southern Properties, Roosevelt Hotel, New Orleans, La.

Jan. 26-27—Central Electric Railway Association, Hotel Gibson, Cincinnati, Ohio.

Jan. 31—New York Electric Railway Association, annual meeting, Hotel Commodore, New York, N. Y.

American Association News

Next Convention City to Be Decided

A JOINT meeting of the committee on policy and the sub-committee on convention contract will be held at association headquarters at 10 a.m. Dec. 16 to decide upon the location of the 47th annual convention. J. P. Barnes, first vice-president of the association, is chairman of the committee on policy and Frank R. Coates, past-president of the association, is chairman of the subcommittee on convention contract.

Engineering Committee Appointments

BESIDES the committee appointments in the Engineering Association already reported special committee No. 9 of the Power Division is announced. In addition, Morris Buck, New York, N. Y., has been appointed to the committee on subjects, and L. W. Birch, Mansfield, Ohio, has been appointed to the committee on heavy electric traction vice M. W. Manz, resigned.

The personnel of the new committee follows:

POWER DIVISION—SPECIAL COMMITTEE NO. 9—CONDUIT SPECIFICATIONS

A. J. KLATTE, electrical engineer Chicago Surface Lines, Chicago, Ill., chairman.
R. B. W. PECK, New York, N. Y.
W. J. QUINN, New York, N. Y.
E. F. NORTON, New York, N. Y.
HARVEY WOOD, New York, N. Y.
R. B. PATTERSON, Washington, D. C.

Rolling Stock Committee No. 3 —Car Design

MODERN cars must be designed to provide faster schedules with increased acceleration and braking rates, was the general opinion of members of special rolling stock committee No. 3 on car design, which met at association headquarters, New York City, Nov. 30. Those present were H. H. Adams, chairman; O. W. Basquin, J. A. Brooks, C. A. Burleson, W. J. Clardy, L. J. Davis, Charles Gordon, W. L. Harwood, A. P. Jenks, A. L. Kasemeier, G. L. Kippenberger, John Lindall, W. R. McRae and H. S. Williams. In addition to the preceding members of the committee, there were also present at the invitation of the committee N. R. Brownyer of the Timken-Detroit Axle Company, E. R. Fitch of the Westinghouse Air Brake Company, C. W. Squier of ELECTRIC RAILWAY JOURNAL, and Guy C. Hecker of the association staff.

To obtain suggestions as to desirable work that could be undertaken by the committee and the scope of any investigation or tests that should be made, each member was invited to comment on desirable data that should be collected. The general opinion was that in particular two problems should receive attention. first the mechanical problem of studying technical characteristics of various types of drives that are now being incorporated in several improved trucks, and second, a study of features that are needed to meet modern transportation conditions. Some of the essential factors that the committee thought should be considered are light weight, comfortable seating, faster acceleration and braking rates, and faster schedules. With some of the new designs brought out, rates of 3 m.p.h.p.s. for acceleration and braking can be used without discomfort to passengers.

In discussing this phase of the problem, it was generally agreed that smoothness of acceleration is an important factor in connection with any increase made. Jerky acceleration is liable to result in an increased number of accidents from people falling inside cars. Some members of the committee felt that a study of floor coverings should be made in connection with any recommendations for increased acceleration or braking rate. The committee decided that an efficiency test of gearing should be made to obtain preliminary test data throughout the life of the gear. A subcommittee was appointed to obtain an estimate of expenditures necessary for complete tests, the time required, and to outline a desirable procedure in order that the test should be uniform and give desired information.

The committee also decided that an analysis of the advantages and disadvantages of new truck designs recently brought out should be made in comparison with conventional truck designs, and a sub-committee was appointed to compile, by correspondence, a complete comparison of the various new truck designs with trucks of corresponding capacity of the conventional type sold by each manufacturer. The purpose of the collection of these data is not to determine the relative merits of any of these trucks but rather to give the committee a complete comparative analysis of the design so that it can visualize better the possibilities and limitations of the radical developments that have taken place in the last year.

A study of the desirability of so-called de luxe features in cars for a large city, small city and an interurban property was discussed and it was the feeling of the committee that attention should be devoted to the study of this subject. Another phase which some members of the committee felt should receive attention was that of determining the elements in construction and painting which have a desirable or undesirable effect upon the general appearance of cars.

Purchases and Stores

PLANS for the special committee work were discussed at the first meeting of the standing committee of the new Purchases and Stores Division of the Engineering Association held at association headquarters, New York, on Dec. 6.

John Y. Bayliss, chairman, presided. W. J. Walker was elected secretary and A. A. Ordway vice-chairman. The session was largely devoted to the presentation by special committee of preliminary reports on the subjects recommended for consideration during 1928. There was a discussion of the desirability of handling certain of the work of the division in co-operation with the stores accounting committee of the Accountants' Association. There was also a discussion of the possibility of having a joint session with the accountants at the 1928 convention. R. A. Weston, chairman of the stores accounting committee was in accord with co-operative work and a joint convention session.

A program committee to formulate plans for the session on purchases and stores at the 1928 convention was appointed consisting of J. Y. Bayliss, chairman; J. Fleming, W. E. Scott, C. A. Harris, A. A. Ordway and R. A. Weston.

Those in attendance at the meeting were: J. Y. Bayliss, Richmond, Va.; A. S. Duncan, East Pittsburgh, Pa.; A. L. Fischer, Cincinnati, Ohio; W. E. Scott, Philadelphia, Pa.; A. A. Ordway, Boston, Mass.; J. Fleming, Washington, D. C.; W. J. Walker, Schenectady, N. Y.; E. A. Murphy, Indianapolis, Ind.; R. A. Weston, New Haven, Conn.; W. P. McArdle, New York, N. Y.

New Association Bulletins

FOLLOWING is a list of special reports that are being prepared by the bureau of information and service of the American Electric Railway Association, and that will be available to member companies on request:

Bulletin No. 173.—Wages of Employees Other Than Trainmen.—A new edition of the association's regular bulletin on wages of employees other than trainmen, showing for about 250 companies the classification of employees and the wages paid each class in the shop, barn, way and structures, carhouse, overhead line, stores, bus maintenance and garage departments. It also shows the number of hours worked weekly, the average weekly wage earned, overtime rates, and the number of employees in each department.

Bulletin No. 174.—Special Reduced Rate Tickets.—A tabulation showing whether or not companies are required to give reduced transportation rates to children, students, workmen, or any others, based on a survey of nearly 300 companies. Where reduced rate transportation is required by law, the table shows what rates are specified and whether or not tickets are sold on the cars and, if not, where they may be purchased.

Bulletin No. 175.—Rate of Return Allowed Electric Railways.—Extracts from decisions of public utility commissions on which the rate has been fixed after official determination of the amount upon which the company is entitled to earn a return. This is a new edition of Bulletin No. 96, issued on Aug. 1, 1926, and includes decisions handed down since that date. A second part has been added showing rates of return established in franchises.

Bulletin No. 176.—Free Transportation on Electric Railways.—Shows for 338 electric railway companies whether or not they grant free transportation to policemen, firemen, letter carriers, employees and members of employees' families. In addition there is shown whether or not such free transportation is required by law and, where this is the case, the nature and extent of the requirement.

In addition to the above the following supplements have been prepared, bringing the information they cover down to Dec. 1, 1927:

Supplement No. 2 to Bulletins Nos. 163 and 164.—*Electric Railway Fares.*

Supplement No. 3 to Bulletin No. 160.—*Wages of Trainmen.*

Supplement No. 3 to Bulletin No. 161.—*Wages of Bus Men.*

Cost of Living Studies (Bulletin No. 177).

News of the Industry

Under New Auspices

Riding public informed of management change in St. Louis. Work of receiver publicly recognized

OPERATION of the lines of the United Railways, St. Louis, Mo., was started at midnight Nov. 30 by the St. Louis Public Service Company. So far as the riding public was concerned there was no appreciable change. Motormen and conductors wore hatbands with the name of the company and in addition the conductors had silk badges with the inscription "We Start Today." Each passenger upon entering the car was handed a folder entitled "All Aboard." The lead article was headed "We Make Our Bow." On the outside of all the cars were signs reading: "Now! This Street Railway System is Operated by the St. Louis Public Service Company." Inside the cars were other signs telling of the change in management. On some of the cars the old "U.R." on the outside had been replaced with the words "Public Service" painted in orange on a black background. Other cars will be so marked as quickly as possible.

The old United Railways tokens will be used for the time being, while the supply of transfers on hand when Receiver Rolla Wells turned over the properties will be utilized and transfers with the name of the new company probably will not appear for about a month.

Full-page advertisements were inserted in all of the St. Louis newspapers headed "Today We Make Our Bow." The body of the advertisement was as follows:

Beginning today the St. Louis Public Service Company is operating the railway system of St. Louis and St. Louis County. Service will be maintained without interruption and for the present there will be no changes affecting patrons.

In assuming the responsibilities that go with the maintenance and operation of this great transportation system we wish to recognize, with keen appreciation, the good physical condition of the property as it is turned over to us by the receiver, Rolla Wells, Col. A. T. Perkins, his manager, and staff.

The St. Louis Public Service Company begins its management of the railway with a thorough understanding of the growing transportation needs of this community. The new management includes men of training and long experience in the operation of railway properties. These men have been assisting in the reorganization and are familiar with the property.

The St. Louis Public Service Company assumes the task of serving the public. This service must be of such a character that it will win both the good will and patronage of the citizens of this community. It will be the policy of the new company to determine the character of service desired by the public and then to supply that service with the understanding that the public will gladly pay the fare necessary to maintain it.

Frank criticism and constructive suggestions will be invited. It is only through a mutual understanding of the problems involved that complete confidence can be built up. The St. Louis Public Service Company pledges itself to do everything possible to establish that confidence, so that a cordial relationship may exist between the patrons and its transportation system.

Subway Items in Budget Hit

Supreme Court Justice Wasservogel has handed down an opinion granting a peremptory writ of mandamus to William Jay Schieffelin against Mayor Walker of New York, the Board of Estimate and others on the application of the Citizens Union for elimination from the 1928 city budget of a $13,000,000 appropriation for amortization of the first instalment of rapid transit stock for the new independent subway system.

The New York *World* says:

Whatever the outcome of this litigation, it has already become evident that the Delaney plan is unworkable. Mr. Delaney asked for an initial budgetary allotment of $20,000,000, which was to be quadrupled within four years. It was found that the first $20,000,000 could not be provided without raising the tax rate or else curtailing expenditures for other purposes. The city administration naturally shrank from either alternative and consequently was compelled to reduce the first appropriation to $13,000,000. The setback which this plan has received in no way interferes with the unification program now in preparation by the Transit Commission. Instead, it rather emphasizes the need of the economies of unified service as the way out of the muddle.

Readers, What Have You?

NEW YORK Public Library, 42d Street and Fifth Avenue, New York City, wants to complete its volumes of *Street Railway Journal*, the predecessor of this paper. It is making an appeal to us to help find the missing numbers. It lacks the following:

Vol. 1—November, 1884, to October, 1885.

Vol. 2—November, 1885, to October, 1886.

Vol. 3—November, 1886, to December, 1887.

Vol. 4—January, 1888, to December, 1888.

Vol. 5, No. 1—January, 1889.

Vol. 5, No. 6—June, 1889.

Here is your chance to contribute to an institution national in character, and noted as a reference library, the numbers it needs to complete its file of information about the activities of this industry.

Another Jitney Move in Detroit

State Supreme Court refuses to reopen case there which debars parasites from principal thoroughfares

THE Michigan Supreme Court on Dec. 1 refused to reopen the hearing conducted before it last year involving the right of jitneys to operate in Detroit. It is believed that the state court's action, which also included the dissolving of all jitney injunctions, blocks any possible new attempts to get the case back into that court. It dissolved its own injunction previously existing against the enforcement of the ordinance. The legal battle between the city and the jitney organizations has extended from 1922, when the ordinance was passed ruling the jitneys off certain principal streets over which they operated. Since that time court actions of various kinds have prevented the enforcement of the ordinance and the jitneys are still operating.

Corporation Counsel Charles P. O'Neil is awaiting the receipt of the official Supreme Court order before taking any steps to enforce the ordinance. The jitney organizations base their hope for the future on the temporary injunction issued more than a year ago by Circuit Judge Harry J. Dingeman, restraining the city from enforcing the ordinance. Judge Dingeman is now ill, and it was announced by the Corporation Counsel that if the State Supreme Court's order does not dissolve the Dingeman injunction the quickest way to end the injunction will be sought.

The ordinance was first held invalid by the Circuit Court, but on an appeal to the State Supreme Court by the city, that court found it sound. A later motion by Edward N. Barnard, counsel for the jitney drivers' associations, was denied. State Supreme Court Justice John Bird later signed an injunction temporarily restraining the city from making the ordinance effective. Then the matter was carried by the attorney for the jitneys to the United States Supreme Court on constitutional grounds. The city appealed to the full State Supreme Court following the order of Justice Bird and not only lost the appeal but was ordered not to enforce the ordinance until further instructions were received from that court.

Court actions against the jitneys, which are believed to make Judge Dingeman's injunction ineffective, include the state court's action in holding that the ordinance is valid, the denial for one motion for a rehearing and the denial of a recent motion by the jitney organizations for leave to file a motion for rehearing. The United States Su-

preme Court has also thrown the case out on the ground that it has no jurisdiction, no federal question being involved.

It has been announced by Mr. Barnard that the jitneys will continue to operate until the injunction is dissolved and that the matter will be appealed to higher courts on new grounds that have arisen since the first appeal.

"Narrow-Gage" Will Be Electrified

Hemphill & Wells have purchased the Boston, Revere Beach & Lynn Railroad. New owners plan to give suburbanites de luxe transportation

ELECTRIFICATION plans for the Boston, Revere Beach & Lynn Railroad, popularly known as the "narrow-gage," have been divulged by Gardner F. Wells, new president of the railroad, which was recently purchased by Hemphill & Wells of New York City, an engineering and management organization. The organization also operates the Interstate Street Railway of Attleboro, Mass., and the Poughkeepsie & Wappingers Falls Railway, serving Poughkeepsie, N. Y.

The purchase of the stock of Karl C. Adams, president of the road, amounting to more than 5,000 shares of the outstanding 8,500 shares, at $137.50 a share, was effected through a holding company known as the Eastern Railway Associates, Boston, according to Boston newspaper reports.

Following a complete engineering investigation, the board of directors, consisting of Daniel P. Abercrombie, Charles A. Collins, Albert W. Hemphill, Walter P. Simonds, Gardner F. Wells and George W. Wells, issued the following statements concerning the electrification and the financing of the improvements:

"In order to give the patrons of the road the benefit of improved service, more expeditious movement of trains and modern, efficient methods of operation, with resulting advantage to the company and to the traveling public, the necessary steps will be taken to electrify the company's line and to install such other improvements and equipment as in the judgment of the general managers will most effectively promote the rendering of speedy, efficient and satisfactory service.

"In order to finance the proposed improvements and for other corporate purposes, the directors recommend to the stockholders that they authorize immediate application to the Department of Public Utilities for authority to issue 1,700 additional shares of stock, and $1,000,000 of general mortgage bonds of the company."

Application will be made to the Department of Public Utilities for authority to issue eventually 11,900 additional shares of stock and $1,000,000 of general mortgage bonds, but of the additional stock it is planned to issue only 1,700 shares immediately, authority with respect to the balance being desired for future refunding purposes.

"Subject to the Department of Public Utilities for the security issue necessary to finance the undertaking," stated Gardner F. Wells, "the new management will carry forward its plans to electrify both the 12-mile double-track main line between Lynn and the East Boston ferry terminal and the Winthrop loop line.

"The 3-ft. gage will be retained on the entire system, totaling 34 miles of single track. The complete program will cost more than $1,000,000 and includes the purchase of new car equipment, remodeling of all stations, installation of an overhead system and the construction of substations.



Main line of the Boston, Revere Beach & Lynn Railroad from Lynn to the East Boston ferry and the Winthrop loop

"The cars to be used will be of the de luxe type, modern in every respect and comfortable as well as attractive. The seats are to be individual type, leather upholstered. The cars will be mounted on special narrow-gage Brill trucks, with 50-hp. special-design motors and control equipment for multiple-unit operation. They will be designed so that trains of any number of units, from one to ten, can be operated.

"Catenary type overhead will be installed to distribute the 600 volts direct current to be used on the system. The overhead system was selected rather than the third rail because of the many cuts and marshes on the road and because of the trouble which would accompany the heavy winter snows. Two permanent substations and one portable substation will be used to distribute the electrical energy, which will be purchased from local central stations.

"All passenger stations will be repainted and remodeled. The prepayment system is to be used so that selling tickets at the stations and collecting them on the trains will be eliminated.

"The company plans to give the patrons a high-speed electric service which will prove much more satisfactory than any given heretofore. Trains will operate at more frequent intervals and with greater elasticity.

"Electric trains will provide not only a faster ride but also a cleaner ride. This feature will be appreciated particularly in the tunnels on the road, where the smoke from the steam locomotives has proved in the past a nuisance to the patrons and a problem to the owners."

Steam Operation Began Over Half Century Ago

Since July 20, 1875, more than half a century ago, the "narrow-gage" has been operated to the great convenience and advantage of residents of the North Shore between Boston and Lynn. Its beginning was a humble one, for the company's entire rolling stock included three locomotives and eleven cars. On the first day of operation the trains carried 1,078 passengers. The fare from Boston or Lynn to Revere Beach was 10 cents, making the fare between Boston and Lynn 20 cents. In 1891 the company absorbed the Boston, Winthrop & Shore Railroad, which it made the Winthrop branch. This road was a similar narrow-gage passenger line with a route of 4.7 miles from East Boston to Winthrop and one of 12.6 miles from Crescent Beach to Point of Pines, Revere. Although the line paid no dividends when operated by an independent company, it proved profitable as a branch of the Boston, Revere Beach & Lynn Railroad.

The first president of the railroad was A. P. Blake. In 1891 Col. Melvin O. Adams became president and took over the executive management of the railroad. Upon the death of Colonel Adams, six years ago, his son, Karl C. Adams, succeeded as president and executive manager of the railroad, so that the railroad has been sort of a "stepchild" of the Adams family.

Road Experienced A Rapid Growth

Tunnels were put through the hills in East Boston in the '90s and a new terminal was built with a drop and ferry slip. During the same period the 5-cent fare was introduced, making the total fare from Lynn to Boston only 10 cents. The number of passengers increased by leaps and bounds and increased carrying capacity was demanded. The cars were enlarged and the locomotives were built heavier and larger. Today, after a half century of operation, the company has 26 locomotives and four big, modern ferry boats. Through its long period of operation the road has continued to pay dividends, a rare accomplishment for any railroad.

Another Move to Restore Railway Service in Columbia

A manufacturer of buses with a branch office at Atlanta, Ga., recently made a definite proposal to the City Council of Columbia, S. C., to operate the street cars of the Columbia Railway, Gas & Electric Company in connection with the buses now run there. The proposition was made by attorneys representing the manufacturer and the Carolina Transit Company, which originally operated the buses in Columbia. Some time ago the bus maker, creditor of the Carolina Transit Company, took over the operation of the buses.

According to the proposal, the bus maker will organize a company with a capital of $250,000 to take over the bus lines and the railway equipment, now idle in the carhouse, and run the two in conjunction.

The suggestion is conditioned on several points, namely, that a proper arrangement can be made with the Columbia Railway, Gas & Electric Company, owner of the railway system, whereby the new company will have conveyed to it the franchise of the old company; that a contract can be arranged to furnish the new company with power at a reasonable rate for a period of ten years; that the City Council enforce the ordinance regarding the operation of jitneys on the streets of Columbia, an ordinance now before the South Carolina Supreme Court; that all litigation concerning the railway system be terminated, and that the Council use its efforts in securing a reduction of the taxable value of the railway system as it appears at the present time and that the Council relieve the system of any obligation for street paving which now exists by virtue of ordinances passed heretofore.

According to the proposal, the manufacturer believes that at the beginning of operation by the new company some 25 or 28 pieces of equipment, including cars and buses, would be in operation on the streets of the city. The Columbia Council has taken the proposal under consideration.

After the street cars were withdrawn last March several actions were started in the courts to compel the restoration of trolley service. Disposition of these has not yet been made. The jitneys also instituted proceedings relative to the constitutionality of an ordinance which required the jitneys to operate over a certain prescribed route and on regular schedule. This matter is also before the courts.

At present the jitneys, carrying passengers for 10 cents, operate over any streets they see fit, cease operations when they so please and offer a competition to any other form of transportation that can hardly be met. Buses too are operated on a 10-cent fare. The jitneys, carrying passengers direct to their doors, have so reduced the patronage of the buses that the latter can hardly keep on operating indefinitely.

The outcome of the latest move to restore railway service in the capital of South Carolina is said to be very problematical.

Successful Bidder for Staten Island Equipment Not Decided

No decision has been made on the public auction sale of trackless trolley cars and trolley cars which took place at the office of the Department of Plant and Structures of the city of New York on Dec. 5. The equipment was first offered in separate parcels and then in one lot. R. W. Marshall, New York, was the high bidder for the separate parcels and H. E. Salzburg & Company, Inc., New York, was the high bidder for the material to go in one lot. A decision on the disposition of the equipment will be made soon. The equipment that was sold was used by the city in service operated by it on Staten Island.

From Exclusive Brighton to Downtown Rochester by Tube

Rochester's $12,000,000 subway in the bed of the abandoned Erie Canal was opened on Dec. 1, with local shuttle service and interurban cars operated by the New York State Railways. There was no official ceremony, but thousands of persons used the line on the first day. A bursted water main held up operation for three hours, but that was the only incident to mar the beginning. The shuttle line provides local high-speed service between Winton Road at the eastern end of the line to City Hall, in the heart of the downtown district.

Rochester & Eastern interurban cars have been diverted from the city streets at Monroe Avenue and are now running in the subway through the city, greatly relieving the traffic congestion problem.

The New York State Railways also is providing freight switching service to industries along the subway line.

Because installation of signals has not been completed, the maximum possible speed is not yet in effect on the railroad.

The shuttle service is maintained on approximately a half hour schedule, starting with a running time of eleven minutes from Winton Road to City Hall. This speed, City Railway Commissioner Barnes announced, would be cut considerably when signal installation is finished and the operators are more familiar with the tracks.

The fare on the subway is 9 cents within the limits of the city and 5 cents additional outside.

The shuttle service provides a much needed means of rapid transportation for commuters from the suburb of Brighton. All trolleys make stops at the following stations: City Hall, Court Street, Meigs Street, Monroe Avenue, Culver Road, Colby Street, Winton Road, Highland Avenue, Elmwood Avenue and Rowland's Loop.

The first interurban car leaves City Hall station at 6:10 a.m. and the last one departs at 11:10 p.m. A 30-minute schedule is maintained in the rush hours and hourly otherwise. The local service starts at 6:15 a.m. and stops at midnight.

The subway, running from Oak Street on the western edge of the city and ending at Brighton, an exclusive residential suburb, will be operated by the New York State Railways for a three-year trial period under virtually the same terms as those of the service-at cost contract under which city railway and bus service is maintained.



First commuters arriving at City Hall station following the opening of Rochester's new $12,000,000 subway

No Selection Yet

Chicago parties fail to agree on arbitration board member. Matter pending since last July

The failure of Judge Kickham Scanlan, representing the street car men's union, and E. J. McIlraith, Chicago Surface Lines' representative, to decide upon a third member of the arbitration board which was approved by both parties on July 19, has resulted in some public discussion. Names of some 25 different persons have been submitted to both members, but the majority have been flatly rejected.

Officials of the local union are said to feel the companies have been remiss about carrying out their part of the arbitration agreement. Mr. Mahon, president of the Amalgamated Association of Street and Electric Railway Employees, is expected to arrive in Chicago this week for the purpose of deciding what action is best. The Chicago Rapid Transit Company trainmen have agreed to be governed by any arrangement reached by the Surface Lines negotiations.

The negotiations for a new wage scale date back to June 1, when the last wage agreement expired. At that time, the Surface Lines employees demanded an increase of 15 cents an hour together with the $20 weekly sick benefits and $1,000 in life insurance, which had been granted to the Rapid Transit Line employees last year. The street railway companies subsequently countered with a proposal to reduce wages 5 cents an hour, maintaining that wages and working conditions in Chicago were the highest and best in the country and that present business conditions justified a cut rather than an increase. The arbitration agreement, which was adopted in July after six weeks of parleying, during which the trainmen voted to authorize their union officials to call a strike if necessary, admitted both the company's and the union's demands as subjects for mediation.

Federal Judge James H. Wilkerson announced that inasmuch as the Chicago Railways is under his jurisdiction, because of receivership proceedings, he might summon the companies and the union representatives before him should the situation become acute. The Chicago Railways represents approximately 60 per cent of the city's street railway mileage.

Fare Hearing in St. Paul on Jan. 5

The postponed hearing by the Minnesota Railroad and Warehouse Commission of the application of the St. Paul City Railway for an increase in car fare, now 8 cents cash or six tokens for 40 cents, is set for Jan. 5, 1928. The former date was Nov. 14, 1927. Judge T. D. O'Brien and W. H. Oppenheimer have been retained by the St. Paul Association of Public and Business Affairs to aid Corporation Counsel Arthur A. Stewart to represent the city. The company alleges it is not receiving the 7½ per cent set by the commission as a fair rate of return on the company's property valuation. The city and association will oppose any increase in fare.

Careful New Jersey Operators Will Receive $130,000

Approximately $130,000 will be paid to operators of railway cars and buses under the no-accident bonus plan put into effect Dec. 3, 1926, by the Public Service Railway and Public Service Transportation companies of Newark, N. J. The object was to provide an additional incentive to careful operators and the further promotion of safety. With the expiration of the first year's trial of the plan the operators will be paid, beginning Dec. 12, by which time the complete records will have been computed. The plan called for the payment to operators of bonuses for good accident records.

The plan will be continued for another year under revisions which will give the operator more frequent returns for his efforts. While Vice-President Boylan says that it is difficult "to determine whether it has brought the return in accident reduction which this large expenditure warrants," nevertheless, believing the great majority of men have tried to co-operate, he has decided to try it again. Under the new plan the year will be divided into three bonus periods as follows:

First period to run from December, 1927, to March, 1928; second period from April to July, 1928. third period, from August to November, 1928. Bonuses will be paid for each period as follows: To operators having a perfect record, $20; to those having one accident, $19; to those having two, $17,-50; to those having three, $15. Those having more than three accident will not be entitled to any bonus. In addition, an extra $20 will be paid to those having perfect records for the three periods. Bonuses will be paid during the first month following the expiration of a period.

In addition a carhouse or garage bonus will be awarded to the carhouse or garage in each division which makes the best showing in each bonus period. The record will be based on a comparison of the number of accidents per 100,000 car-miles during each bonus period, with the record for the corresponding four month of the previous year. This bonus will be $5 for each operator assigned to the winning carhouse or garage on the last day of the bonus period.

Those eligible to bonus participation are regular or extra operators engaged in passenger service who work 95 days in any bonus period. Any operator failing to report an accident of which he has knowledge becomes ineligible for bonus in that period and any operator leaving the service of the company before the final day of any bonus period forfeits his right to any bonus for that period.

Suspended Railway Proposed for Montreal

In an attempt to solve the problem of traffic congestion on the Island of Montreal, Canada, a plan for the transportation of passengers new at least to Canada is now being studied by the chief engineer of the Montreal Tramways Commission, who has been instructed by the commission to report on it.

The system, in brief, may be described as an overhead railway which differs from the ordinary elevated system in that the cars, instead of running on tracks, are suspended like baskets from a specially designed running beam. The designer, W. E. Hamilton, with the assistance of his son, C. Harold Hamilton, has devised the scheme for the peculiar conditions of Montreal. As described the proposed system is apparently similar to the famous suspension monorail over River Wuppur at Elberfeld, Germany.

A report on the proposed system is now being prepared for the chairman of the Tramways Commission. In the meantime the plans are undergoing constructive criticism at the hands of various tramway and railway officials to whom the scheme has been presented by the designer.

Work Started on Important San Francisco Line

Mayor Rolph of San Francisco, Cal., broke ground on Nov. 24 for the Judah Street car line, which is to tap the Sunset district. Sunset residents gathered in jubilation over the long-looked-for line of the San Francisco Municipal Railway. After a brief program of speechmaking the contractors began work on the line. It is expected the road will be completed by Feb. 15.

Date Fixed for Subway Bids in New York

The Board of Transportation of New York City announced recently that it would receive bids on Dec. 30 for construction of another section of the new subway system in Brooklyn, running along Manhattan Avenue from Nassau Avenue to Greene Street, in the Greenpoint district. The contract is the third advertised this month for bids on subway construction work in the area between McCarren Park and Long Island City.

Bids on the section in Long Island City from Arch Street to Queens Street, to form the junction of the Queens Boulevard and Brooklyn crosstown routes at the connection with the 53d Street tunnel to Manhattan, were to be received by the Board of Transportation Dec. 9. On Dec. 21 the Board of Transportation will receive bids for the section along Manhattan Avenue, under Newtown Creek, and along Vernon and Jackson Avenues from Freeman Street, Brooklyn, to Arch Street, Queens.

New Franchise Modern in Terms Wanted in Grand Forks

Unless a new franchise not so exacting as the present one is granted to the Grand Forks Street Railway, Grand Forks, N. D., by the City Commission the company will go into liquidation as the stockholders will not be willing to continue longer with a proposition that is paying no dividends and shows no prospects of being a paying investment.

Urging immediate consideration of the matter, by the Council a representative of the company stated that the annual meeting of stockholders would be held on Jan. 11, and a 60 days notice of the matter of applying for a new charter had to be given the stockholders. Unless there is some assurance of the company being relieved of the cost of paving, counsel explained that there was no use in trying to obtain a majority vote of the stockholders for the renewal of the state charter.

Baltimore Fare Testimony Concluded

Testimony has been concluded before the Maryland Public Service Commission on a petition filed by the United Railways & Electric Company, Baltimore, Md., for permission to increase the car fare from 7½ cents to 10 cents. Lawyers on both sides have been requested to file briefs with the commission. Final arguments will then be heard.

Fare Increase Sought in Wichita

The Wichita Transportation Company, Wichita, Kan., has filed with the City Commission a request for a new twenty-year franchise and an increase in fares for its electric railway. The company wants street car fares the same as fares for buses, single 8 cents and on down with 24 fares for $1.50. Early in the present year the system at Wichita passed into control of local interests.

Ten Cents in Council Bluffs

The report of the master in chancery which granted the request of the Omaha & Council Bluffs Street Railway for a 10-cent fare in Council Bluffs, Iowa, was recently affirmed by Judge Martin J. Wade. The present fare on the railway line is 7 cents. The city of Council Bluffs fought the attempt to gain a 3-cent boost, contending that the old 5-cent fare was a sufficient and just charge.

In his statement Judge Wade decried the fact that Iowa had no statute providing for the regulation of electric railways. Nearly all other utilities were regulated by public bodies, he pointed out, but under the Iowa law no public body had the power to fix rates and regulate service of a railway. Expressing his impatience with the situation in Iowa with reference to fixing the rates for elecric railways, he said in part:

I have sat for hours almost without number in these cases—the Des Moines street railway, the Ottumwa case and others—in which eminent counsel have talked for hours about the fixing of electric railway rates. For years there has been discussion, but nothing else, about having the power to fix rates conferred upon a commission, or upon the railway commission, or upon the City Council, all without results.

"Borrow Books" Suggested to Cincinnati Employees

All employees of the Cincinnati Street Railway, Cincinnati Ohio, are urged by the management to take advantage of the invitation of Chalmers Hadley, librarian of the Public Library of Cincinnati, to visit the library and borrow some good books and magazines, which really belong to all taxpayers. With time and material on hand the company asks in the *News*, its official organ, "Do we want more pleasure in living and a wider knowledge of the world and its people? We will have only ourselves to blame if we do not use our public library." Mr. Hadley explained in a letter to the company how easy it is to get books.

Another Sensation in Grand Rapids

With city officials, railway experts and mechanical engineers as special guests, the Grand Rapids Railroad, Grand Rapids, Mich., gave the final tests to the new Versare six-wheel electric railway coach a few days ago and placed the new vehicle in regular service for experimental purposes.

With the distinguished company on board the coach was run over the company's lines so they might appreciate the riding qualities, quick acceleration, quick braking and other factors that are sought in meeting present-day traffic conditions. Included in the party were Mayor Elvin Swarthout, City Manager Fred H. Locke, City Consulting Engineer Gerald J. Wagner, City Engineer C. W. Darling, Director of Public Service W. A. Sperry, Director of Public Welfare A. E. Davidson, Safety Director James Sinke, Vice-President and General Manager L. J. DeLamarter of the railway and these representatives and experts representing the industry: O. F. Warhus, vice-president of the Versare Corporation, Albany, N. Y.; W. H. Beattys, Jr., Chicago; J. S. Y. Fralick, Chicago; K. A. Simmon, Pittsburgh; J. C. Morrell, Pittsburgh; P. L. Hermann and W. N. Mohr, Detroit; N. M. McKibbin, Detroit; A. D. Wood, Chicago.

The new coach, developed after two years work by the Grand Rapids Railroad and the Versare Corporation, has been very favorably received by the public.

Philadelphia Electrification Ready by June

Electrification of the line of the Pennsylvania Railroad from Philadelphia to Wilmington and the Octoraro branch to West Chester, via Swarthmore and Media, will cost approximately $11,000,000. The Wilmington line will be completed early in June, 1928, and the West Chester line is expected to be in operation in August. It has been announced that installations of electrical equipment on 128-passenger cars for operation on these lines is practically completed. The electrification of these two lines is part of the railroad's plan now being actively developed for the construction of the new main passenger terminal on the west bank of the Schuylkill, a subway extension under Filbert Street and an underground station for suburban trains at Fifteenth Street and the Parkway. All suburban trains will be electrified for operation in the subway.

Vote Asked on Long Beach, Cal., Proposal

D. W. Pontius, vice-president and general manager of the Pacific Electric Railway, has proposed to the city of Long Beach, Cal., that there be a vote of the people on the three alternative transportation propositions recently presented to Long Beach. In his letter to the city authorities, Mr. Pontius says:

We ask that at the next election, if you do not feel one should be called for this particular purpose, you place on the ballot for the consideration of the voters these three propositions:

Shall the offer of the Pacific Electric Railway to serve the city of Long Beach with local service by unified operation of street cars and buses be accepted?

Shall the Lang Transportation Company's offer to operate local bus service in the city of Long Beach under a 2½-year permit be accepted?

Shall the city of Long Beach establish and operate its own municipal bus service in the city? (If this is carried affirmatively a bond issue will be necessary and will have to be considered at a later election).

The City Manager disagrees with Mr. Pontius concerning the necessity of a bond issue for inauguration of a municipal system of buses. He thinks it can be financed otherwise.

New Identification Signs in Topeka

With the advent of the new year, Topekans will be able to identify the cars of the Topeka Railway, Topeka, Kan., from afar. New 6-ft. boards with signs telling the destination of the car are to be affixed to the upper part of the cars on either side, indicating the town on which line the car is operating. The signs are to be decorative as well as beneficial to the riding public. At present Topeka street cars carry signs only in front.

Recent Bus Developments

Accounting Order Expected in Pennsylvania in January

Promulgation of an order relating to bus accounting effective Jan. 1, 1928, is probable by the Public Service Commission of Pennsylvania. To this end there was a public hearing before the commission in Harrisburg on Nov. 15. At previous informal conferences, all motor carriers and others interested in the subject were permitted to submit criticisms, amendments and changes.

Several of those who spoke mentioned preference for the classification adopted in 1926 by the National Association of Railroad and Utilities Commissioners and by the American Electric Railway Accountants Association in 1925.

Except for a few instances the Pennsylvania classification follows the fundamentals of the other. Depreciation, however, is not considered a part of maintenance expense, but is set up in a group with amortization of other capital following "other general expenses." The title of this new group is to be "Depreciation and Amortization." Operating expense groups are arranged in the following order: Conducting transportation, maintenance, traffic, general administration expenses, other general expenses and depreciation.

The classification as drawn applies to bus companies, taxicab companies and to trucks when they are an incidental part of passenger operations.

Common carriers are divided into four groups, and for the first three, a classification has been drawn. Class A applies to carriers having an average annual operating revenue of more than $250,000, Class B from $50,000 to $250,000, Class C from $10,000 to $50,000 and Class D, of less than $10,000, for which no classification is prescribed.

Higher Bus Fares in Kansas City Under Consideration

The Kansas City Public Service Company, Kansas City, Mo., is considering raising bus fares and eliminating at least three non-paying bus lines, as it is considered by company officials that this is the only means by which this branch of the public carrier system can be continued in operation. It is expected that these changes will be incorporated into a new franchise now being studied and which will be submitted to the City Council at the expiration of the present grant June 1, 1928.

The Armour-Peaso line, according to Fred G. Buffe, vice-president of the company, is the only one of the nine in operation to show a profit. Operation of the present bus system for the past three years has cost the company $526,636 more than the total receipts. The average operating cost for each mile is placed at 27 cents, compared with the average receipts of 24.4 cents a mile. Officials of the company believe that a cash fare of 15 cents with two tokens for 25 cents will show a proper return on the money invested. In addition to the increased rate, it is planned to use the buses for the most part only during rush hours. The Winchester, Leeds and South Troost lines, because of the poor showing they have made, are slated for discontinuance. They are said to show a loss of approximately 10 cents a mile. In 1926 the system operated at a loss of $307,302 and so far this year the loss has been $134,530.

From Pasadena to the Pacific at Long Beach

The Pacific Electric Railway, Los Angeles, Cal., has applied to the Railroad Commission for a certificate of public convenience and necessity to operate auto stage service between Pasadena and Long Beach over a route specified in detail in the request to the state body.

Fewer Cruising Taxis in Philadelphia

Experiment in regulation under co-operation of state body and city authorities. Diamond and Cunningham cabs pass to local railway

ON DEC. 12, or shortly thereafter, a plan will be put into effect in Philadelphia which it is expected will serve still further to relieve street traffic congestion. It relates to the regulation of the cruising taxi. Its narrow downtown streets greatly complicate the problem of traffic congestion in Philadelphia. Last winter congestion became so acute that car and bus riders of the Philadelphia Rapid Transit Company were seriously inconvenienced. Cruising taxicabs in the central business district naturally add to the volume of traffic.

The Yellow Cab Company felt for a long while that if the cruising problem could be satisfactorily solved the traffic situation would be helped considerably. Accordingly the Pennsylvania Public Service Commission appointed a committee of cab operators, one from each of the four most prominent companies, to report a plan to eliminate the cruising practice. The commission has now approved this report, and the City Council has passed an ordinance authorizing the establishment of the additional 176 cab stands in the central section.

Plea Made for Cruising Cabs

The committee representing the cab companies held numerous conferences, but it was apparent at the outset that continuation of intensely competitive methods among rival cab companies would make impossible any effective regulation of cruising. Moreover, the two smaller companies—the Diamond and the Cunningham—felt that they would suffer material losses in revenue if forbidden to cruise, since their revenue is derived almost wholly from this source. This obstacle, however, was removed by the agreement of the Philadelphia Rapid Transit Company to purchase and merge them with the Yellow Cab Company under terms to be submitted to the commission for approval.

Full consideration was given to the valuable service which the cruising cab now provides to the riding public by making this form of transportation readily accessible in the busiest sections of the city. However, the committee believed that the plan which it submitted, while reducing to a minimum the interference of the taxicab with moving traffic, will at the same time increase its usefulness as a public carrier by making it even more accessible to prospective riders.

Expansion of Present Cab Stand Idea

At present there are fifteen regular cab stands in the district affected by the new plan, with accommodation for 60 cabs. In addition about 540 cabs are now cruising in the downtown streets at the peak hour. It was recommended that the present stands be retained and that 176 new stands be established with accommodation for 384 cabs. The number of cabs within the district in the peak hour will thus be reduced from approximately 600 to 444, or about 25 per cent. The feeling of the committee was that these cabs will give a better service than is now possible, since they will be distributed more nearly in accordance with traffic requirements and will be stationary except when in actual service or when returning to a stand. In so far as possible these stands are placed at such frequent intervals that any prospective rider can get a taxicab at the nearest street corner.

Telephones will be installed at each end of 159 of the proposed 191 stands, one connecting directly with the Quaker switchboard and the other with the Yellow switchboard. These phones will be available to the public without charge.

Yellow and Quaker have agreed that the two companies shall have equal rights at all stands and that the stands will also be opened to any other cab company or individual cab owner operating under certificate of convenience

from the Public Service Commission. Cabs bringing riders from the residential district to the business section will, after discharging their passengers, proceed to the nearest telephone stand and report by telephone to the dispatcher. Cabs carrying riders out of the business district will be replaced by additional cabs dispatched from garages as needed. During the peak hours all stands will be occupied in accordance with the demands of traffic. At all times cabs will be under the supervision and control of the telephone dispatchers and street supervisors in the district.

In other words, the two larger companies, Quaker and Yellow, are ready, with the co-operation of the commission and the city authorities, to conduct an experiment in cruising regulation within the district bounded by Arch Street on the north and Walnut Street on the south, inclusive, from the Delaware River to the Schuylkill River, these boundaries to be extended later to include the entire city as rapidly as the new method proves itself feasible and in the public interest.

New Entertainment for Toledo Children to Ride Buses

Mothers in Toledo, Ohio, are finding a new use for the feeder bus lines operated by the Community Traction Company. They give the children a nickel and put them on the bus, with a result that a child can be entertained for an hour or more by making five rides. Some children also use the bus as a pleasure vehicle by getting a dime and taking the whole neighborhood for rides. The fare for children is 1 cent.

Commissioner E. L. Graumlich reported to the board of control that the practice does not bother the company much because it is carried on mostly in off hours when travel is light. Children are provided with safe passage, are practically insured against injury and they get a good long ride for their money. Bus operators get to know them by their first names and this acquaintance feature has proved helpful in creating goodwill between drivers and patrons.

Agreement Reached on Maryland Bus Rules

New rules dealing with the operation of buses in Maryland have been agreed upon by the Maryland Public Service Commission and the operators. At a hearing on Dec. 1 all the rules but one as agreed upon at an earlier hearing were acceptable to all concerned. The one rule required the companies to make detailed reports every two weeks. These reports require so much time that the operators asked the commission to make a change.

It has been agreed that the companies keep duplicates of the daily manifests and file these every two weeks and then make detailed reports once a month. It is said that this plan was agreed to by John N. Mackall, chairman of the State Roads Commission, who wanted the reports for his department. The copies of the manifests, however, will supply him with the information he needs, it was stated, and the Public Service Commission has agreed to make this change, which met with the approval of the large number of operators who attended the hearing.

Effort to Speed Up New York Grants

Efforts are being made to speed up the hearings by the New York Transit Commission to act as quickly as possible on the applications of the Equitable Coach Company and the Tompkins Bus Company for certificates of convenience and necessity to enable them to exercise the bus franchises awarded by the Board of Estimate. The franchise granted the Tompkins Bus Company for operation on Staten Island stipulated that operation should begin within 120 days after the grant and this period will expire on Dec. 10. There is a further clause in the franchise which, in effect, grants a further period of thirty days, in which time either the board or the company may cancel the franchise.

It was said in city circles recently that the company probably would apply for an extension of the 120-day period if the commission did not grant a certificate at once. It has been discovered that through error there is a gap about a mile long in one of the Staten Island routes covered by the Tompkins Company's franchise. It was said that this route probably would have to be readvertised and approved again by the Board of Estimate.

During the week objection was registered before the commission by the Brooklyn-Manhattan Transit Corporation to the affirmation of the bus grants.

Buses May Be Operated on Another St. Louis Line

The St. Louis Public Service Company, St. Louis, Mo., plans to eliminate its Marcus Avenue railway line between Easton and Natural Bridge Avenue. If this move is made buses will be substituted for the one-man cars now in use and the line will be extended northward to connect with the Bellefontaine and Taylor Avenue car lines at West Florissant Avenue.

For the Convenience of Portland's Scholars

The Portland Electric Power Company, Portland, Ore., has extended its 39th Street bus line for a number of blocks in the Eastmoreland district to accommodate students of the new Eastmoreland school, recently opened. This gives through service to a district where previously more than one transfer was necessary from street car to bus.

Gray Line Activities Intensified

Electric railways, particularly those affiliated with the Gray Line, will be interested in the deliberations of the convention of the Gray Line, held at Banff, Alberta, Canada, during the latter part of September, 1927.

So as to foster co-operation between tourist agents and transportation, railroad and steamship companies and the Gray Line, plans were made for the co-ordination of ideals for increasing mutual benefits, with the end in view of supplying the general public with the highest type of service. Many details were discussed tending toward the betterment and development of sightseeing, to which each member contributed his part with pertinent remarks.

Diverse phases of sightseeing were taken into consideration to increase the efficiency of the service of the Gray Line, and to maintain good will all along the line. In fact, all possible avenues for the heightening of the standards of the service which the Gray Lines is organized to give were explored.

Louis Bush, president, emphasized the importance of co-operation in his report. He said, in part:

> You have in your hands probably the greatest travel institution of all times. Have you the vision to see past your own little sphere? Our future lies ahead. Remember it is by giving and doing that we succeed, and if each one will do his best for his fellow members the benefits will be greater than all that money could buy. Operating under the principle that by one all are known is rather a dangerous one unless we also adopt a further ideal of service above self.

In the secretary's report Mr. Springer enumerated the accomplishments of the past year. He advised of the wonderful growth of the Gray Line family by the addition of St. Paul, Milwaukee, Portland, Me.; Buffalo, San Diego, Norfolk, Pittsburgh, Kansas City, Ottawa, Montreal, Quebec and Minneapolis. Mr. Springer further outlined the progressive plans and ideals guiding the future development of the Gray Line, and also reviewed the results of the efforts of Mr. Dooley, traveling representative for the organization.

Officers were elected for the ensuing year as follows: Louis Bush, president, Washington, D. C.; E. B. Brown, vice-president, Los Angeles; Adrian Hughes, Jr., treasurer, Baltimore, and George E. Springer, secretary, Baltimore.

In addition to the officers, the members of the executive committee are as follows:

J. I. Brewster, Banff; S. K. Smith, Salt Lake City; J. J. Reddington, New York; H. B. Olsen, Victoria; C. C. Kunz, Chicago; B. L. Thomas, Boston; J. L. Crowley, Philadelphia, and W. A. Mulpeters, San Francisco.

The next annual convention will be held at New Orleans, La., Oct. 8-10, 1928.

Financial *and* Corporate

Approval Sought for $7,000,000 of Capital Improvements

Acting under the 1907 city-company agreement, the Philadelphia Rapid Transit Company, Philadelphia, Pa., on Dec. 1 requested City Council to approve the expenditure of $7,000,000 of capital funds for property betterments and retirement of securities. The request was sent to the transportation committee. It was explained that the money was to be used next year, and Ralph T. Senter, president of the P.R.T., gave details of the purposes for which the money was to be applied.

Preferred stock in the amount required is to be sold to raise the money. The largest amount is $2,750,000 for miscellaneous track improvements, extensions of lines, betterments to carhouses and substations, in compliance with the Snow report to the Public Service Commission. This work is to be done on various lines and at all of the carhouses and substations, it was said.

Retirement of bonds of underlying companies is included in the financial program for 1928. The largest amount in this part of the program proposed is $1,375,000 of car-trust certificates issued in payment of rolling stock. In addition, the financial item of the request sets forth that $92,000 of P.R.T. bonds maturing in 1957, $60,000 maturing in 1962 and $105,000 of the issue maturing in 1944 are to be retired.

There are also $20,000 of the Philadelphia & Willow Grove Railway bonds, maturing in 1934; $34,000 of Union Traction, maturing in 1952, and $25,000 of the People's Passenger Railway securities to be disposed of.

Oakland Branch Abandonment Prohibited

The California Railroad Commission denied the application of the Key System Transit Company to abandon a branch line which extends along Piedmont Avenue from the southern gate of Mountain View Cemetery to a connection with the Piedmont Avenue car line at or near the intersection of Piedmont Avenue and Mather Street, in the city of Oakland.

Dividend on Manhattan "L" Stock Deferred

The Interbourough Rapid Transit Company announced on Dec. 6 that the dividend on Manhattan Railway stock due on Jan. 1 will be deferred. Under the modified guarantee, the Interborough pays $5 a share annually as dividend rental on stock of the company from which it leases the elevated lines. A back dividend rental of $1.25 on the stock declared Sept. 1 brought payments on the stock up to date. Frank Hedley, president and general manager of the Interborough, said:

Under the terms of the Interborough-Manhattan readjustment plan of 1922, the amount of the quarterly instalment of Manhattan dividend rental due Jan. 1, 1928, is determined by earnings for the three summer months ended Sept. 30, 1927. The earnings of that period, calculated as provided for in the plan, were insufficient to warrant any payment.

For the four months to Oct. 31, the Interborough reported gross earnings of $20,917,881 and deficit of $302,805 after interest and charges.

Engineers Engaged to Survey Massachusetts Interurban

The Boston, Worcester & New York Street Railway, incorporated as a result of a drastic reorganization of the property of the Boston & Worcester Street Railway, Framingham, Mass., has engaged the Buchanan & Layng Corporation of New York to make a complete survey of the situation and take charge of the operating management of the company. C. B. Buchanan, the president, is now in Framingham and will spend three or four months in a personal study of all angles of the situation affecting both passenger and freight service and motor coach operation.

Holding Company for St. Louis and Kansas City Stock

A company to hold common stock of the electric railways of St. Louis and Kansas City, known as the City Utilities Company, has been organized under the laws of Delaware by J. K. Newman and others interested in the St. Louis and Kansas City railway systems. Mr. Newman has been elected president of the new company and Col. A. T. Perkins, who was manager of the United Railways under Receiver Rolla Wells, has been named vice-president.

The City Utilities Company was formed to expedite the work of looking after the affairs of the new interests in St. Louis and Kansas City. The extent of its holdings has not been made public.

Mr. Newman was one of the chief figures in the reorganization of both the St. Louis and the Kansas City railway properties.

Stock of the Kansas City Public Service Company is held in trust for five years by five trustees, W. S. McLucas, William G. Woolfolk, George W. Davison, J. K. Newman and Powell Groner. This was accomplished under the reorganization plan. Beginning in April voting trust certificates were issued to the owners of the old holdings of the railway.

Traffic, Fare and Wage Figures

Electric railway traffic continued to decline during the month of October compared with the similar month of the previous year. The number of revenue passengers, including bus passengers, reported to the American Electric Railway Association by 198 companies for October, 1927, compared with October, 1926, is as follows:

October, 1927.....	785,250,909
October, 1926.....	801,672,805
Decrease, per cent.....	2.05

The average cash fare in cities of 25,000 population and over:

	Cents
November 1, 1927.....	7.9846
October 1, 1927.....	7.9516
November 1, 1926.....	7.7570

Average maximum hourly rates paid motormen and conductors in two-man service by companies operating 100 or more miles of single track:

	Average Hourly Rate Cents	Index Number 1913 = 100 Per Cent
November 1, 1927.....	57.27	210.17
October 1, 1927.....	57.26	210.13
November 1, 1926.....	56.88	208.73

$18,000,000 Refunding Issue at Minneapolis

An issue of $18,000,000 in refunding bonds of the Twin City Rapid Transit Company, Minneapolis, Minn., to be used for refunding the bonded debt of both the St. Paul City Railway and the Minneapolis Street Railway is planned by the company. The purpose of the company, according to a statement by Mr. Lowry, is to make possible refunding of all existing debt as it matures, and to provide complete separation of the bonded debt of the two companies. The companies operate independently under state regulation.

A statement issued in anticipation of the issue being advertised for sale to the public by the bankers said:

The first and refunding 5½ per cent mortgage bonds of the Minneapolis company and the refunding 5½ per cent mortgage bonds of the St. Paul company are to be pledged as collateral security, dollar for dollar, for an issue of first lien and refunding 5½ per cent bonds of the Twin Cities Rapid Transit Company.

This will enable the operating companies to refund their present bonded indebtedness as the same matures, at a cost much less than if each company were financed independently. It also provides a complete separation of the bonded indebtedness of the two companies and the cost of the money will be the same in each city.

There will be issued at this time $18,000,000 of first liens and refunding 5½ per cent gold bonds of the Twin City Rapid Transit Company. This issue of bonds has been sold to a syndicate of bankers headed by the Federal Securities Corporation, including the Chase Securities Corporation, New York; H. M. Byllesby & Company, Inc., and Halsey, Stuart & Company, Inc. It is expected this banking syndicate will make a public offering of the securities at an early date.

A petition filed with the state regulatory body stated that the bonds will

mature in 25 years. A total of $12,037,000 will be pledged by the Minneapolis company with $5,963,000 allocated to the St. Paul company.

Public offerings of the $18,000,000 Twin City issue was made on Dec. 7 at a price of 97 and interest to yield more than 5.70 per cent.

Revenue and Traffic Fall Off in Honolulu

The total revenue from all sources for the year 1926 of the Honolulu Rapid Transit Company, Honolulu, Hawaii, was $1,023,772, compared with $1,074,483 for the year 1925. Total operating expenses for the year were $662,932, compared to $708,716 for the year 1925, in addition to which the sum of $13,939 was charged to operating expenses for replacements during the year, compared with $26,283 for replacements during 1925. These facts were contained in the manager's report, a part of the annual statement.

The number of passengers carried during the year 1926, compared with 1925, is here shown:

Rail:	1926	1925
Full fares and half fares	16,286,105	17,071,473
Free fares	92,081	169,929
Total	16,378,186	17,241,402
Transfer passengers carried	3,357,651	3,499,425
Kalihi Bus Operations:	1926	1925
Full fares and half fares	347,287	351,044
Free fares	1,108	1,686
Total	348,395	352,730
Transfer passengers carried	315,165	305,923
Bus miles operated	128,441.30	130,596.70

The segregation of transportation revenue and operating expenses is here shown, comparing the years 1926 and 1925;

Revenue:	1926	1925
Passenger revenue	$992,063	$1,040,452
Bus revenue	21,536	21,081
Special car revenue	1,265	1,254
Freight revenue	242	.....
	$1,015,107	$1,062,788
Operating Expenses:	1926	1925
Way and structures	$55,204	$63,111
Equipment	74,127	76,797
Power	94,179	104,868
Conducting transportation	322,356	346,578
Traffic	2,252	5,926
General and miscellaneous	114,811	111,435
	$662,932	$708,716

Power was taken from the Hawaiian Electric Company during the months June to October, both inclusive, and the three-year contract was terminated as of Dec. 1. The company is now operating its own power plant without a stand-by contract, but with the assurance that power will be furnished in case of emergency at the contract rates pending negotiations for a new contract.

Expenditures on upkeep of track and equipment were kept as low as possible consistent with the general program of economy.

The capital expenditures program for the past year amounted to $28,333.

The report states that the group life insurance has proved its value in the assistance provided for the families of several employees who died since the insurance has been in effect. The employees' relief fund, which is handled by the employees' council, is being drawn upon in many cases of real need and is proving a benefit which is well worth while.

President Castle's report to the stockholders refers, among other things, to the Sachse survey and recommendations.

REVENUE ACCOUNT OF HONOLULU RAPID TRANSIT COMPANY, LTD., FOR YEAR ENDED DEC. 31, 1926

Revenue from transportation		$1,015,107
Operating expenses		662,932
Net revenue from transportation		$352,175
Revenue from other railway operations		8,664
Net revenue from railway operations		$360,840
Taxes—		
Property	$83,188	
Income	9,672	
Capital stock	1,030	
Corporation income	25,924	
Public utilities	2,074	
Vehicle licenses	739	
Bus licenses	50	122,678
Gross revenue, less operating expenses and taxes		$238,161
Depreciation	$46,607	
Replacements chargeable to operating expenses	13,939	
Loss on property retired	3,097	63,644
Net revenue 1926		$174,517
Interest on loans	$6,318	
Dividends	150,000	156,318
Balance net revenue 1926 to surplus		$18,198
Surplus:		
Balance as at Jan. 1, 1926	$266,406	
Less, additional corporation income tax, 1924	4,689	261,716
Balance carried to 1927		$279,914

Situation in Oklahoma City Declared Promising

The Oklahoma Railway, Oklahoma City, Okla., has been placed on a paying basis under the federal receivership, according to figures made public by G. T. Lackey, one of the receivers. Net earnings of the company from Jan. 1 to October of this year were $89,571, after all expenses and depreciation were provided. During October the net earnings were $14,188, compared with $8,114 for September. A large amount was spent for repair work and new material in September.

Purchase of California Line Sanctioned by I. C. C.

Plans of the trunk line railroads for acquiring the Central California Traction Company were finally approved on Dec. 5 by the Interstate Commerce Commission.

The Southern Pacific, Western Pacific and Santa Fe will jointly take over the electric railway under the arrangement approved, paying for it $2,650,000.

Under the terms of the original proposal, the Southern Pacific alone would have acquired the electric system, but the commission required it to share ownership.

The railroads concerned already have completed their financing arrangements for the purchase.

Smaller Preferred Dividend in Denver

The directors of the Denver Tramway Corporation, Denver, Col., have declared a quarterly dividend of three-quarters of 1 per cent on the preferred stock payable on Jan. 1 to holders of record Dec. 15. From October, 1925, to October, 1927, inclusive, the company paid quarterly dividends of 1¼ per cent on this issue. The preferred stock is preferred as to dividends up to 7 per cent per annum, of which the first 5 per cent is cumulative, whether earned or not, and the remaining 2 per cent cumulative only when earned in any year, but not paid.

New Directors in St. Louis

The new directors of the St. Louis Public Service Company, successor to the United Railways, are as follows: Louis P. Aloe, president A. S. Aloe Company; A. T. Perkins, vice-president City Utilities Company; Mark C. Steinberg, president Mark C. Steinberg & Company; Stanley Clarke, vice-president St. Louis Public Service Company; A. C. F. Meyer, president Lafayette-South Side Bank; J. K. Newman, president Newman, Saunders & Company, Inc., New York and New Orleans; Henry S. Priest, Boyle & Priest; A. L. Shapleigh, president Shapleigh Hardware Company, St. Louis; J. Sheppard Smith, president Mississippi Valley Trust Company; Walter W. Smith, vice-president First National Bank in St. Louis; F. O. Watts, president First National Bank in St. Louis; George W. Wilson, president Mercantile Trust Company, and Hugo Wurdack, president Wurdack Securities Company.

OPERATING STATEMENT OF THE HONOLULU RAPID TRANSIT COMPANY, LTD.

	Gross Operating Revenues			Operating Expenses and Other Charges								Net Revenue, Exclusive of Deductions for Depreciation and Interest and Profit and Loss
	Transportation	Other than Transportation	Total Revenue	Way and Structures	Equipment	Power	Conducting Transportation	Traffic	General and Miscellaneous	Total Operating Expenses	Taxes	Total Operating Expenses and Taxes	
Total 1926	$1,015,107	$8,664	$1,023,772	$65,832	$77,438	$94,179	$322,356	$2,252	$114,811	$676,872	$122,678	$799,550	$224,221
Total 1925	1,062,788	11,695	1,074,483	88,261	80,894	101,904	346,578	5,926	111,435	735,000	94,847	829,847	244,636

Book Reviews

The Claim Agent and His Work

By Smith R. Brittingham, LL.B., assistant general solicitor Seaboard Air Line Railway. New York: The Ronald Press Company. 466 pages. Price $6.

There are too few books on the important subject of claim adjustments. Their place is not taken by treatises on the law of negligence, written primarily for lawyers, although they also form a necessary adjunct to the library of the claims man. The book under review, by an author who understands the problems met in railroad claims work, while primarily directed to the steam railroad claims man, has also practically as direct application to the electric railway field.

The first half of the book is devoted in large part to a general review of the salient principles of the law of accident liability. There are chapters, for instance, on the passenger, employee under the common law, employee under the federal employers' liability act, licensees and trespassers, invitees or guests, and workmen's compensation. In the latter part of the book, where the scope and principles of claims adjustment are more directly considered, the topics discussed include: Principles of investigation, releases, statistical methods in claim agency, psychology and claim agency, medical phases of claim agency, some problems of the claim agency, and forms. Besides these, there are tables of the expectation of life in years, life annuities, etc., and the appendices include glossaries of medical and legal terms.

The book should help the claim agent over many a difficult problem. It should also, if read by the operating railway manager, indicate to him clearly, if he does not already realize that fact, the extent of the responsibilities of the claim agent and the importance of the work of the claims department.

Beyond the Counter

Mary B. Reeves, manager industrial and school savings the Philadelphia Saving Fund Society, Philadelphia, Pa., 1927. 86 pages. Price $1.90.

Assuming that the welfare of the worker is an important factor in the growth of an industry and the development of a community, a necessary requirement is enlightenment within the ranks concerning the workers' responsibilities as potential capitalists. Thus does labor become stabilized and capital and labor mutually supplementary. There must be a service to help investors, in the opinion of Mary B. Reeves, who has studied banking methods in this country and abroad as a free lance. She has a message for every employer and employee. The employee by this time knows that systematic saving is insurance against anxiety, business reverses and desolate declining years.

At some length Miss Reeves discusses the need for industrial saving from the viewpoint of the employer and gives in detail the two main classifications, namely, the payroll deduction plan and the voluntary association plan. It is her belief that the idea of industrial saving is as yet new to the majority of employers. After years of working in this field she sees in industrial savings a means to reduce labor turnover, to improve the workers' morale and to lessen radical tendencies within the ranks. She is unsympathetic with the notion that employees resent this intrusion into their personal affairs. Rather do they welcome it if the advertising appeal is made with a knowledge of human psychology and from the viewpoint of the worker.

Now that many utility employees throughout the country have had the opportunity to become part owners of an enterprise by subscribing to company stock for their future welfare, Miss Reeves' argument, differently presented for consistent thrift practices and wise expenditures, will meet with their ready indorsement. Her plan means education, to the end that $1,000,000,000 shall not be thrown away annually in speculation.

The Art of Speculation

By Philip L. Carret. Boston, Mass.: Barron's, the National Financial Weekly. 365 pages. Price, $3.

To some persons the title "The Art of Speculation" would seem to have a sinister sound. But the title must be accepted in its broader sense. The need does not exist to go into a discussion of relative values, but it would seem that the reader should be reminded that every one who invests is really a speculator. There is a certain inescapable risk in the ownership of even the highest grade securities. But this review is not intended to be either a defense of the title of the present book or of its contents.

One thing is certain. There is much of interest in the book, particularly for those engaged in various phases of public utility work. Of course, the contents are intended primarily for the market operator, but the chapters that tell the reader how to analyze an annual report correctly, how and when to buy bonds and stocks, carry by their implications a message to officials intrusted with the conduct of the fiscal policies of the corporations for which they act. Of the electric railways in general the author has comparatively little to say, but he concludes his consideration of them with this paragraph:

Cut-throat competition of bus lines among themselves and with the interurbans will eventually be ended by financial exhaustion of the weaker participants and by legislative and court action to insure safe and adequate public service. When that day comes a real bull market in traction securities is by no means inconceivable.

The prospects of receivership are not pleasant to contemplate, but there is much food for thought in the chapter "Profits in Financial Surgery." Mr. Carret has so handled his subject as to make the book very readable.

Bibliography on Management

Prepared under the direction of the executive committee of the A.S.M.E., Management Division, New York, N. Y. Price $1.65.

This work represents important material published on management. The more than 2,000 references to be found within its pages will show the valuable literature appearing in American and Canadian periodicals and in a great number of books published in England and in Great Britain the past 25 years.

N.E.M.A. Handbook of Supply Standards

New York, N. Y.: National Electrical Manufacturers Association. 231 pages. Price, $3.50.

This completely revised edition of the N.E.M.A. Handbook of Supply Standards is indexed and illustrated and contains standards indorsed by 189 manufacturers, with approximately 125 illustrations, diagrams of designs and methods and numerous tables and curves. These standards have been approved by the standards committee, the official body for the control of technical standardization within the association. "This handbook represents in printed form the experience and knowledge of practical and technical men, who have for years been most vitally concerned with the design, manufacture and installation of electrical supply equipment," says C. A. Bates, chairman of the standards committee.

Alternating-Current Rectification

By L. B. W. Jolley, M.A., General Electric Company, Ltd., London, England. New York, N. Y.: John Wiley & Sons, Inc. 472 pages. Price, $6.

Unidirectional currents have large possibilities both in the supply of power and in the laboratory, yet in no branch of electrical engineering has development been so retarded as in that of rectification. Mr. Jolley has prepared the second edition of his book, "Alternating Current Rectification," noting new improvements and revising the contents thoroughly.

In this treatise the author describes clearly the methods for rectification available and presents the mathematical analysis with numerical examples whenever such are possible. The book covers wave form, mechanical rectifiers, gaseous conduction, liquid conduction, wireless rectifiers and alternating current measurements and voltage regulations. Thermionic rectifiers have received particular attention.

Personal Items

New Management Takes Hold in St. Louis

OFFICERS of the St. Louis Public Service Company, which started operation of the properties of the United Railways at midnight on Nov. 30, include the following: A. L. Shapleigh, president; Stanley Clarke, executive vice-president and counsel; Sam W. Greenland, vice-president and general manager, and Thomas E. Francis, general attorney.

Mr. Shapleigh's position as president of the newly organized properties will be primarily a supervisory one as it was with the United Railways when he served in a similar capacity. He is an important business factor in the West and an officer of the Shapleigh Hardware Company. In commenting on his new position President Shapleigh said that in accepting the post of president he felt that he and his associates, directors and officers of the company, were aware of their responsibility to the public, which it would be their aim to discharge in full. He considered that the general public of the community, as well as the company, owes much to the manner in which the railway properties were maintained during the receivership, just ended, under the leadership of Rolla Wells, as receiver, and Col. Albert T. Perkins, as his manager. With hopes for co-operation on the part of the city and the general public, the aim would be to maintain good service, and from time to time to introduce certain changes in the line of improvements.



Stanley Clarke Sam W. Greenland

Stanley Clarke, who will be in immediate control of the company as counsel and executive vice-president, was counsel for the reorganization committee representing the old security holders. Before going to St. Louis he was prominent in New York, where he was in general law practice.

Sam W. Greenland, the new vice-president and general manager, will have a task ahead of him as important as he had when he went to St. Louis in 1924 to assist in the work in connection with the reorganization of the United Railways. In assuming the rôle of ameliorator at St. Louis he resigned his position as vice-president and general manager of the Indiana Service Corporation, Fort Wayne, Ind., and as general manager of the Fort Wayne & Decatur Traction Company and the Fort Wayne, Van Wert & Lima Traction Company.

Mr. Greenland has a knowledge of public utility problems covering a period of nearly 30 years. In the Middle West he stands for progress both in modernizing and merchandising railway transportation. A notable example of his genius in these respects was his deft handling of the Fort Wayne properties, where an important part of his work was the recasting of the financial structure of the Fort Wayne & Northern Indiana Traction Company and the organization of its successor, the Indiana Service Corporation.

Mr. Greenland was born at Clarion, Pa., in 1879. He was educated at the Pennsylvania Military College, Chester, Pa., and at Penn State University. From the time of his first utility job with the Bell Telephone Company at the turn of the century up through his various connections, both in operating and association activities, until he became identified with the Fort Wayne properties in 1911 and later the St. Louis properties, is a long recital of pushing ahead, winning the confidence of his public and doing big things. The details of this career were included in an extended biography published in the ELECTRIC RAILWAY JOURNAL, issue of April 19, 1924.

Thomas E. Francis, who will act as general attorney for the St. Louis Public Service Company, served as general attorney for the receiver of the United Railways. He estimates that all of the legal work on hand can be disposed of in a month or six weeks from Dec. 1, and then with the acceptance of the report of the receiver the St. Louis Public Service Company will be free to operate the St. Louis railway system as a private corporation still subject to the state law.

With the enthusiasm attending the ushering in of the new régime the untiring efforts of the Wells-Perkins combination in the reorganization details were not overshadowed. St. Louis newspapers unanimously complimented Receiver Wells on the manner in which he filled an important job since 1919. His farewell message to the officials and employees thanked them for their loyalty to him and the company, their support of the rules and policies, their efficiency in service and co-operation for its success. Mr. Wells leaves his post very little changed in appearance with the passing years and he still retains that freshness of outlook and keen analytical vision that made him a civic, financial and political leader of the community. The son of the original promoter of the old Missouri Railroad, Rolla, at the age of 22, was serving as manager of this system. That chapter covering the years 1878-1883 was an important one in the career of the man who was to serve two terms as Mayor of St. Louis and become a leading figure in business and banking circles.

The commendatory comments on Mr. Wells' success are shared by Col. A. T. Perkins, who served as general manager under the former's receivership and helped to make the partnership of Wells and Perkins an important one in transportation affairs in that city. Mr. Perkins, who retains a place on the board of directors, was an executive officer and engineer of various railways and adviser on terminal matters in many cities and served as manager for the receiver in St. Louis since 1919. He began his business career as a clerk in the service of the Chicago, Burlington & Quincy Railroad in Chicago in 1887. Colonel Perkins' announcement of his retirement from the office of general manager for the receiver effective Nov. 30, coincident with the retirement of Mr. Wells, was made by him personally in an address to an audience of employees at the Park Avenue station on Nov. 25.

Receiver Wells filed an affidavit with the Missouri Public Service Commis-

sion at Jefferson City on Nov. 30 that he had complied with all terms of the federal court in the sale and transfer of the properties to the St. Louis Public Service Company. An affidavit was also filed by Walter Dew Bradley, secretary of the reorganization committee, setting forth that all details of the organization had been carried out and that the transfer of the properties would be consummated at midnight on Nov. 30. These filings were mere formalities to perfect the records in the office of the state commission and will be followed by a formal order of the commission transferring the rate schedules of the United Railways and its subsidiaries to the new owners.

L. E. Lippitt Leaves Railway Field

L. E. Lippitt, general manager of the Auburn & Syracuse Electric Railroad, Auburn, N. Y., and former president of the American Electric Railway Accountants Association, has tendered his resignation to T. C. Cherry, president of the company, to take effect on Jan. 1, 1928. He will become associated with the Thermo-Ice Corporation, one of Auburn's new enterprises which manufactures and sells ice refrigerating machines.

Mr. Lippitt is one of the youngest electric railway executives in central New York State. His career began with the Oneida Construction Company, which electrified the West Shore Railroad between Syracuse and Utica. This line is now operated by the New York State Railways. He entered the employ of the New York State Railways in 1907, serving in various subdivisions of the accounting department.

Six years later he was appointed auditor of the Syracuse & Suburban Railroad and three years later became auditor-treasurer of the Auburn & Syracuse Electric Railroad under the management of Peck, Shannahan & Cherry, Inc. Mr. Lippitt was promoted to general manager on July 1, 1926, to succeed W. J. Harvie, resigned.

Mr. Cherry will take over the active management of the railroad as president and general manager on Jan. 1, 1928.

C. E. Smith Goes with New Haven Road

Charles E. Smith, consulting engineer of the city of St. Louis, who last September completed an exhaustive survey of the New York City transit situation for the Comptroller, has been appointed a vice-president of the New York, New Haven & Hartford Railroad. His duties will be to assist President Edward J. Pearson in problems relating to improvements, construction, operation and other matters. Mr. Smith's immediate responsibility, according to New Haven officials, will relate to the development of plans for meeting increasing traffic requirements, for better service to shippers and passengers, and for making such improvements as revenues and credits will permit.

Mr. Smith was born in Somerville, Mass., in 1877. He graduated from the Somerville High School in 1895 and the Massachusetts Institute of Technology in 1900.

The first engineering work done by Mr. Smith was in the summer of 1897, on the New York & New England Railroad, now part of the New Haven System, at and around Boston, and later largely on municipal and county road improvements, during the years 1898-1900. During the years 1900-1903 he was engaged in the bridge engineering department of the New York, New Haven & Hartford Railroad, with which, and its problems, he is already largely acquainted.

During the years 1907-1915 he was employed by the Missouri Pacific Railroad with headquarters at St. Louis for several years as chief engineer in charge of maintenance and construction. Subsequently, under the firm name of C. E. Smith & Company, he has been a consulting adviser to numerous railroads, city administrations, public utilities, industrial companies and for the last 12½ years as consulting engineer and technical adviser to the city administrations of St. Louis on railroad and public utilities matters.

Promotions in Byllesby Personnel

William H. Hodge, vice-president and manager sales and advertising department, Byllesby Engineering & Management Corporation, announces the appointment of J. W. Devereaux as manager merchandise division, T. P. Pfeiffer, manager advertising division; J. F. Gardiner, manager financial advertising, and J. W. Hicks, editor Byllesby publications.

Mr. Devereaux will supervise merchandising activities at all properties under the direction of Byllesby Engineering & Management Corporation. He has been connected with the operating department of the Byllesby organization for the past sixteen years.

Mr. Pfeiffer will supervise the advertising of the Byllesby Engineering & Management Corporation and the companies operating under its direction. He has been in the advertising department since 1922, and prior to that time was with the Louisville Gas & Electric Company for eight years.

Mr. Gardiner will be in charge of financial advertising for H. M. Byllesby & Company. He has been a member of the advertising department since 1922. For eight years previous he was an editor or financial writer for a number of the leading newspapers of the Middle West.

Mr. Hicks has been managing editor of *Byllesby Management* for the last two years. He also will edit the *Byllesby News Bulletin* and *Byllesby Monthly News*. For ten years prior to 1925, when he joined the Byllesby organization, he was engaged in newspaper work in the Middle West and on the Pacific Coast.

Alex Dow Heads Mechanical Engineers

Alex Dow, president of the Detroit Edison Company, Detroit, Mich., will succeed Charles M. Schwab, chairman of the Bethlehem Steel Corporation, as president of the American Society of Mechanical Engineers. Mr. Schwab retires after one year of service. Mr. Dow, prominent in the engineering world, a native Scotsman, who in 1895 became a citizen of the United States, has been a member of the society since his naturalization. He has been connected with the Baltimore & Ohio Railroad, the Brush Electric Company and other companies.

Charles G. Adsit Resigns from Atlanta Property

Charles G. Adsit, nationally known engineer, has resigned as vice-president of the Georgia Power Company, Atlanta, Ga., to enter private business. Mr. Adsit has been long identified with the Atlanta properties. He was made executive engineer on April 1, 1922, with authority and jurisdiction over engineering work of all departments and in May of the same year he assumed the rôle of vice-president.

Prior to his affiliation with the companies operating in Atlanta, he had extensive engineering experience in the western part of the United States, South America and Mexico. He was elected a director of the Chicago & West Towns Railway, Oak Park, Ill., early in the current year.

OBITUARY

Frank J. Gatrell, superintendent of the department of accident investigation of the Chicago Surface Lines and one of the oldest officials in point of service, died at St. Francis Hospital, Chicago, on Dec. 4, after a short illness. He began his service with the claim department of the Surface Lines in 1894 as junior clerk and rose from that position to chief adjuster, general claim agent and finally superintendent of the department. He had a national reputation among claim agents and insurance companies.

Patrick J. Boyle, transportation superintendent of the Community Traction Company, Toledo, Ohio, died on Saturday, Nov. 19. He entered the service of the railway at Toledo 37 years ago as a driver of a horse car and later became a motorman when electric power was applied to the lines. His long experience made him unusually familiar with the property in Toledo and one of the most valuable members of the executive staff. The phrase "Call Pat Boyle" became the order of the day as a way out of most any kind of difficulty. Mr. Boyle was born in Ireland 67 years ago.

Manufactures and the Markets

I.R.T. Needs 107 New Cars Now, Says Colonel Lancaster

At a hearing of the New York Transit Commission on Dec. 5 Col. William C. Lancaster, chief engineer of the commission, testified that 107 new cars were needed immediately by the Interborough Rapid Transit Company and gave as his opinion that 400 new cars would be needed by the company to meet its service requirements during the next two or three years.

Arthur G. Peacock, of counsel for the company, reserved the right to cross-examine Colonel Lancaster. Commissioner Lockwood of the Transit Commission put the matter over for two days.

Distribution of the 107 new cars was suggested by Colonel Lancaster as follows: White Plains Avenue line 40; Pelham Bay Park line, 30; Astoria line, twelve; Lexington-Fourth Avenue line, ten; Corona extension, six, and nine to be held in reserve.

Montreal Tramways Officials Inspect New Cars

Inspection of Montreal's newest type of street cars took place recently when the first of the 50 cars ordered last summer from the Canadian Car & Foundry Company by the Montreal Tramways, Montreal, Canada, were delivered. The order for these cars was forecast in the JOURNAL for Feb. 19, 26 and March 12 and the placing of it in the issue of Sept. 3.

Among those included in the inspection party were Julian C. Smith, president, and Col. J. E. Hutcheson, vice-president and general manager of the Montreal Tramways, and other officers of the company, as well as J. F. Saint-Cyr, chairman of the Montreal Tramways Commission, and Gustave Comte, secretary.

Of the two-man type, the cars have a seating capacity of 44 passengers and are 5 ft. longer than the one-man cars constructed last year. The space between the front facing seats at the head of the car is wider than in previous designs and there is a better arrangement of the motorman's section. This provides more space for passengers.

Some of the new features are that the cords running along the inside of present cars are dispensed with and the signal for the motorman to start is given electrically when the rear door is closed by the conductor. Should the motorman wish to signal the conductor a bell and push-button arrangement is provided. Aluminum rails run along the sides of the car instead of individual hand straps. Safety devices are one of the prominent features of the new cars.

The eighteen buses ordered some time ago cost from $14,000 to $18,000 each. Three of the new buses are of the "street car on rubber" Versare type. The operation is combined gas and electricity and the front of the bus is like the front of a street car with the motor and other equipment in the rear. The other fifteen buses are the regular four-wheel type, similar to those used on Sherbrooke Street.

Steel Tops for Some P.R.T. Buses

Philadelphia Rapid Transit Company, Philadelphia, Pa., it is reported, announced this week that all Penn-Jersey double-deck buses will shortly be equipped with steel tops over the upper open section. There is a possibility that double-deck buses on local lines eventually may be similarly equipped. The new inclosures allow more than 5 ft. headroom on the top deck. The sides of the new covers are equipped with ventilators.

General Prosperity Shown by Hoover's Report

EVERY previous record of volume of production and consumption in the United States and in the physical quantity of exports and imports was broken, according to the annual report of Secretary of Commerce Herbert Hoover. This report, released on Dec. 2, embodies interesting facts on the economic progress of the country in the fiscal year ended June 30.

There was very little unemployment, except during a moderate recession near the end of the year, and the rate of real wages remained higher than anywhere else in the world, or than at any other time in the world's history. The high prosperity of the year did not represent merely an upward swing in the business cycle, but was the result of that general and permanent progress the extent and causes of which are more fully set forth in the various sections of the report. There were a few aspects of American business which were less satisfactory, some of which were noticeable in the coal and textile industries, the relatively low price of cotton with its depressing effect upon the farmers of large regions of the South, and some continued depression in agriculture of the Mid-West.

The volume of output in the manufacturing industries, by all odds the largest branch of productive activity, showed an appreciable gain even above the extremely high level of the fiscal year 1925-1926. The most conspicuous gains shown, as compared with 1925-1926, are in mineral production, freight transportation, output of electric current, and sales of 5 and 10-cent stores. Electric current is being used in rapidly increasing quantities for lighting, for domestic power and heat, and above all for industrial power.

In the discussion of agriculture the situation of the farmer has an important bearing on the general trend of industry and commerce, according to the report. The crops harvested in the autumn of 1926, constituting the main factor in the agricultural situation of the fiscal year, were in the aggregate the largest produced in our history with the exceptions of the years 1915 and 1920.

The report states that the building and construction industries played a great part in the prosperity of the fiscal year. New construction undertaken in the fiscal year 1926-1927, amounting to some seven billion dollars in value, constituted a powerful factor in maintaining general business activity and prosperity.

Railway Efficiency Commented On

During the last two fiscal years a conspicuous increase has occurred in the volume of railroad freight traffic even as compared with the high figures for the fiscal years 1924 and 1925. The ton-mileage of freight in 1925-1926 was about 8 per cent greater than the year before, and 1926-1927 showed a further increase of about 5½ per cent. This gain in traffic was accomplished with an insignificant addition to the number of employees, a fact indicating the continued advance in the efficiency of the railways which has been going on since the close of the war.

Concerning motor transport it is brought out that the rapid increase in the use of motor trucks and motor buses in conjunction with older forms of transport has been remarkable, and this increase reflects to a large degree the rapidly changing conditions in modern methods of transportation and the progress made in highway surfacing. Sixty steam railroads have 1,253 buses in operation, covering 11,440 route-miles, while there are 19,099 buses operated in competition with railroads, the route mileage being 334,522. Electric railroads in 1927 were using 7,284 buses compared with 5,150 the previous year, common-carrier bus route mileage in-

Where Will the Next

A.E.R.A. Convention

Be?

The committee having this in charge will tell us on Dec. 16.

creased from 232,340 in 1926 to 270,068 miles this year. The total number of buses in operation increased from 69,425 to 80,040 during the year.

The financial markets are but briefly touched on in this report. From the banking point of view, the fiscal year, like the calendar year, was one of sound but uneventful growth with ample money at low and stable rates.

Foreign trade, which is one of the principal phases of the Commerce Department, shows a very encouraging growth. The value of exports during the fiscal year 1926-1927 was greater than in any other fiscal year since 1920-1921, and when account is taken of the much lower price level, as compared with the war years, this past year was the greatest in our history.

There has been an extraordinary increase in the production of American industry during recent years with a consequent corresponding advance in the standards of living. This reflects not merely recovery from the dislocation caused by the war, nor from the low point of the post-war slump—it represents in large part an advance beyond the highest pre-war levels and marks a trend which we may well consider of a permanent character.

The basic causes of economic progress translate themselves into a number of more specific and directly working causes. Among these may be mentioned especially the advance in education, scientific research and invention; the growing use of mechanical power, machinery, and other forms of capital; the larger scale of production; the conscious and concerted effort to eliminate waste and reduce costs; the high scale of wages, with consequent general high buying power; and the relative stability of prices, money and credit.

In compliance with the new responsibilities assigned to the Department of Commerce by the passage of the air commerce act of 1926, providing for the promotion and regulation of civil aeronautics, the department's first task was to organize aeronautical activities and select the necessary personnel. These activities were assigned to five divisions, under the Director of Aeronautics and Assistant Secretary of Commerce provided for in the new act.

Copper Makes Further Advance

THE feature of the non-ferrous metal markets during the week ended Dec. 7 was the further advance in price of copper, accompanied by active business for both domestic and foreign accounts. Lead has also sold in excellent volume at somewhat higher prices. Tin has been firm and quiet. The one dull spot has been in zinc, sales being small and prices virtually unchanged.

Copper advanced nearly ½ cent per pound during the week ended Dec. 7. Three advances during the week seem only to have whetted the appetite of foreign buyers, and domestic consumers have felt forced to join the buying movement with the best grace they can muster. The successive advances in the c.i.f. price were as follows: on Dec. 2 from 14.05 cents to 14.25 cents, on Dec. 5 to 14.35 cents, and on Dec. 7 to 14.50 cents. The advances in the domestic market were made sooner by some sellers than others, which accounts for the range in prices for the individual days. Some metal was to be had the morning of Dec. 7 at 14.075 cents, delivered in Connecticut, but in the afternoon this seemed to have disappeared and some producers advanced their price to 14.25 cents.

Though lead prices underwent a sharp advance Dec. 1, there was no let-up in buying; in fact, demand for the next two or three days after the increase was made was better than it had been before. On that day, Dec. 1, the American Smelting & Refining Company advanced its contract price from 6.40 to 6.50 cents, New York, and the principal seller in the Middle West went to 6.325 cents, St. Louis, which was subsequently raised to 6.34 cents. The advance in London culminated on Monday, and with the lower quotations cabled from abroad Dec. 6 and 7 there was less insistent demand on this side.

In spite of the absence of any considerable demand, prices for zinc have remained steady. High-grade is still quoted at 7.75 cents New York, on a purely nominal basis.

Trading in tin has been moderate, with most of the interest on the part of the dealers. Prompt quotations apply also to December and January, later deliveries being about ⅛ cent less. Prices have averaged about the same as last week—about 59 cents for Straits.

METAL, COAL AND MATERIAL PRICES
F. O. B. REFINERY

Metals—New York	Dec. 6, 1927
Copper, electrolytic, cents per lb.	13.825
Copper wire, cents per lb.	15.50
Lead, cents per lb.	6 50
Zinc, cents per lb.	6 20
Tin, Straits, cents per lb	59.125
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	.....
Somerset mine run, Boston, net tons	.....
Pittsburgh mine run, Pittsburgh, net tons	1 825
Franklin, Ill., screenings, Chicago, net tons	.....
Central, Ill., screenings, Chicago, net tons.	.....
Kansas screenings, Kansas City, net tons	2.125
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	5.50
Weatherproof wire base, N.Y., cents per lb.	16.50
Cement, Chicago net prices, without bags	2.05
Linseed oil (5-bbl. lots), N. Y., cents per lb.	10.
White lead in oil (100-lb. keg), N. Y., cents per lb.	13.25
Turpentine (bbl. lots), N. Y., per gal.	$0.55

Malleable Iron Fittings Company Acquires Bridgeport Concern

The Malleable Iron Fittings Company, Branford, Conn., has acquired the Clark-Williams Engineering Company, Bridgeport, Conn. The Bridgeport concern has manufactured and marketed pole mounts for application to telegraph, telephone and power transmission lines. The patented device comprises two heavy malleable iron castings which clamp the butt of the pole to a concrete base embedded in the ground. Rolland G. Williams, the inventor of the device, has joined the staff of the Malleable Iron Fittings Company, and the office of the Clark-Williams Engineering Company has been moved to Branford, Conn.

Twelve One-Man Cars for Knoxville Power & Light

Specifications have recently been released for twelve one-man, passenger, city type, single-end, double-truck cars which were ordered in November by the Knoxville Power & Light Company, Knoxville, Tenn., from the Cincinnati Car Company, Winton Place, Ohio. Mention that the cars would be ordered was made in the JOURNAL Nov. 5.

The units will have an over-all length of 43 ft. 9 in., total weight of approximately 30,000 lb., a seating capacity for 54 passengers and will be of semi-steel construction. The exterior color scheme will be yellow and cream and the interior trim cherry. Haskelite headlining has been specified, as have General Electric No. 264 motors.

Subjoined are the specifications as released by F. V. Underwood, general manager of the Knoxville Company:

Number of units	12
Type of unit	One man, motor, passenger, city, single end, double truck
Number of seats	54
Builder of car body	Cincinnati Car Company, Winton Place, Ohio
Date of order	Nov. 21, 1927
Date of delivery	Four months
Weight, total	Approximately 30,000 lb.
Bolster centers	24 ft. 0 in.
Length over all	43 ft. 9 in.
Length over body posts	33 ft. 6 in.
Truck wheelbase	5 ft. 0 in.
Width over all	8 ft. 6 in.
Height, rail to trolley base	10 ft. 5¼ in.
Window post spacing	30 in.
Body	Semi-steel
Roof	Arch
Air brakes	Westinghouse
Armature bearings	Plain
Axles	3¼ in. diameter
Car signal system	Faraday high voltage
Compressors	Westinghouse DH-16
Conduit	Duraduct
Control	General Electric
Curtain material	Pantasote, double-faced morocco
Destination signs	Keystone illuminated
Door mechanism	National Pneumatic Co.
Doors	End, folding, C-2320
Fare boxes	Cleveland
Finish	Old Dutch enamel
Floor covering	Battleship linoleum
Gears and pinions	13-74 ratio
Glass	Double strength American, set in felt
Hand brakes	Dron handles
Hand straps	White enameled metal
Heat insulating material	Cork and asbestos
Heaters	Consolidated Car Heating Co.
Headlights	Golden Glow, type RM-96
Headlining	Haskelite, ivory color
Interior trim	Cherry
Journal bearings	Plain
Journal boxes	3-in. x 6-in.
Lamp fixtures	Flush type
Motors	GE-264
Painting scheme	Yellow and cream
Roof material	Haskelite
Safety car devices	Safety Car Devices Company
Seats	Hale & Kilburn, 17 in. x 36 in.
Seat spacing	30 in.
Seating material	Green plush
Slack adjusters	Brill
Steps	Folding, 9½ in. x 36 in. treads
Trolley catchers	Ohio Brass
Trolley base	Nuttall U.S.-13-E No. 1224
Trolley wheels	5 in. with V. & K. harp
Trucks	Brill, 76-E1-x
Ventilators	Ten, Nichols-Lintern, type C
Wheels	Steel, 26-in. diameter
Wheelguards	H-B
Special devices	Treadle doors and steps and brake interlocking devices

Its merits are *easily determined*



ESTABLISHING the value of the Peacock Staffless Brake is as easy as finding the circus lot when the circus comes to town—everyone interested is heading in the same direction.

We will be glad to tell you of many street railways located near your own territory where Peacock Staffless Brakes have been made standard equipment. We will furnish you with authoritative data on cost of installation and maintenance.



and finally

—Peacock Staffless Brakes take their place as Emergency equipment—to work positively and without question when all other agencies have failed.

National Brake Company

890 Ellicott Square Buffalo, N. Y.

Canadian Representative
Lyman Tube & Supply Co., Ltd., Montreal, Can.



No Bus Too Big!

With a hundred people crammed aboard this double-decker, jacking would be all the same with a Blackhawk.

One man can do it—and he will not labor—nor crawl in the dirt—nor soil a nifty uniform.

Just gentle strokes of the long handle, and those wheels come off the ground unbelievably easy. Even the shortest strokes will do it.

That long handle not only reaches in under any axle. It holds the jack and sets it square. To lower, use the handle tip to open the release valve. She settles down gently and fast. No pumping needed to lower load.

Blackhawk Bus Jacks go under any front axle, with tire flat. Ample lift for any rear end. Passengers never disturbed.

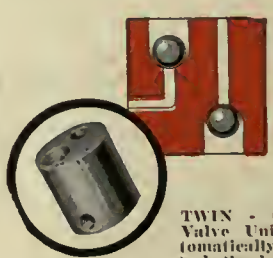
Declared *indispensable* by leading fleet and bus operators—Pickwick is one using 800. Write for details and prices.



"Motortruck" Jack Model C9 (7-ton) lifts from 9-in. low to 14-in. high. Model C11 (7-ton)—11-in. low, 18-in. high. Model D11 (12-ton)—11-in. low, 17¾-in. high. Other models from 1½ to 75-ton lift.

BLACKHAWK MFG. COMPANY
Dept. EJ, Milwaukee, Wis.
Mfrs. of Blackhawk Wrenches and Pumps

BLACKHAWK HYDRAULIC OIL-POWER JACKS



TWIN-CHEK Valve Unit automatically controls the hydraulic oil power. Located below the pump (outside the jack), easily accessible. *Patented.*



Protection *plus*—

THE hardness and toughness of Duco withstands wear of all kinds. For interiors which are exposed to the rubbing and scuffing of the crowds, for exteriors, which must carry on under the direct rays of the hot sun—and through rain, snow and sleet—Duco gives greater durability—and economy.

The smooth surface of Duco is easily cleaned—an important consideration in the operation of any railway.

Refinishing, when necessary, is done in less time and at less cost.

E. I. du Pont de Nemours & Co., Inc.
Chemical Products Division, Parlin, N. J.
2100 Elston Avenue, Chicago, Ill.
569 Mission Street, San Francisco, Cal.

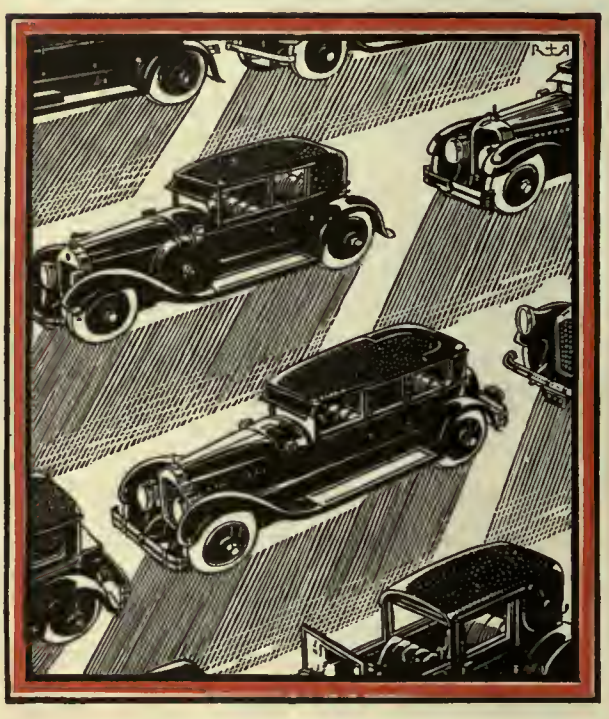
There is only ONE Duco
. . . DUPONT Duco

DUPONT DUCO

REG. U.S. PAT. OFF.

PAINTS - VARNISHES ENAMELS - DUCO

9 Cars *in* 4 Cities *in* 1 Day



A New Britain, Connecticut, car dealer is said to sell more automobiles per capita, of a certain high-priced make, than any other subdealer in the world. In clearing his floor of trade-ins, he uses Long Distance almost exclusively. Not long ago he made ten calls in one day to dealers in other cities. These calls sold two cars in Boston. Two in Worcester. Three in New York. Two in Philadelphia. Cash transactions, $17,000—telephone charges, $19.50!

"I consider the telephone," says this automobile man, "the most valuable and most economical sales asset I have."

Almost any business house has many kinds of work that the long distance lines can do. Buying or selling in a distant city without leaving one's office. Making important appointments. Getting or giving rush information, specifications or prices. All business details can be discussed by telephone, just as in a personal interview. And with heavy savings in time and traveling expense.

What distant person or firm would it be an advantage to talk with, now? You'll be surprised how little it will cost. . . . . *Number, please?*

Bell Long Distance Service

American Telephone & Telegraph Co. and Associated Companies — Bell System

WORKMANSHIP



Behind the manufacture of Long Clutches and Radiators stands the expert workmanship of employees who have been building Long Products for many years.

LONG MANUFACTURING COMPANY
Detroit Michigan

LONG

LONG PRODUCTS—AUTOMOTIVE CLUTCHES AND RADIATORS

Up!

Up!

Up!

His sales volume responded to

INDUSTRIAL ADVERTISING

LISTEN to this story of a business that pulled itself up by its own boot straps, the story of a manufacturer who defied the trend of general business and gained sales volume regardless.

From a minor position to recognized leadership by steady yearly gains, always exceeding the progress of the industry as a whole—that is what took place and how it was done is an open book.

It was a young business, making machinery supplies and small parts—sort of a line of industrial "notions"—just the type that might be thought too small to employ Industrial Advertising effectively. In the light of what happened, no one can tell this manufacturer that Industrial Advertising cannot be geared to a small business. That is just what he did—

Geared Industrial Advertising to His Business

At the outset the policy was established to specialize on worthwhile markets. Their buying habits were studied intently and a complete plan of Industrial Advertising and Selling was built around their needs. Thoughtful attention was devoted to the selection of industrial publications and the preparation of advertising copy. In team-work fashion both sales and advertising strategy were aimed at one thing—*Recognition by worthwhile buyers.*

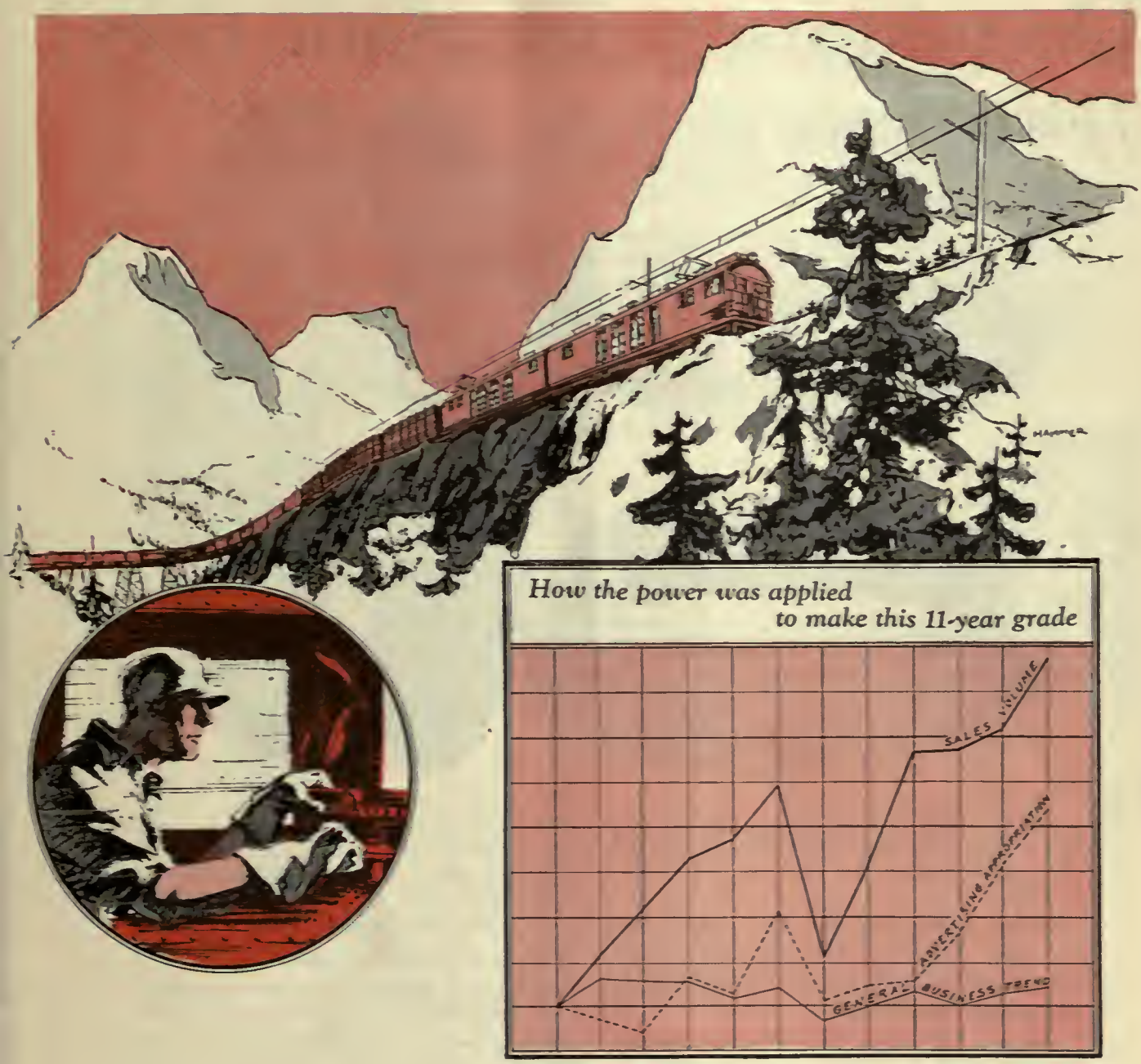
This recognition was found to be the straight line to larger sales volume. Tangible results were greater than a previous inquiry campaign had produced. A check of new buyers against McGraw-Hill subscribers showed that 80% were on both lists.

From each year's business came the wherewithal to produce next year's increase. Eight per cent of gross revenue appropriated for Industrial Advertising produced an average yearly gain in sales volume of nearly 30%. Only once did the manufacturer experiment with a reduced appropriation and this was the only period when he experienced reduced sales. Comparing the three curves of the chart shows that this manufacturer's growth was controlled not so much by general business conditions as by his volume of Industrial Advertising.

Industrial Marketing at Work

After studying hundreds of such successful cases as this, McGraw-Hill prepared its new book, "Industrial Marketing at Work." This book establishes *recognition* as the proper goal of industrial marketing and offers a practical method, in ten logical steps, for its accomplishment.

If your markets lie within any field of industry broader than your strictly local territory a McGraw-Hill representative will gladly discuss this study and present a copy to you or your advertising agency. For promptness, address your nearest McGraw-Hill office.



McGRAW-HILL PUBLISHING COMPANY, INC., NEW YORK, CHICAGO, PHILADELPHIA, CLEVELAND, ST. LOUIS, SAN FRANCISCO, LONDON, PUBLISHERS OF

McGRAW-HILL Publications

Electrical
ELECTRICAL WEST
ELECTRICAL WORLD
ELECTRICAL MERCHANDISING

Construction & Civil Engineering
ENGINEERING NEWS-RECORD
CONSTRUCTION METHODS

Industrial
POWER
AMERICAN MACHINIST
INDUSTRIAL ENGINEERING
CHEMICAL & METALLURGICAL ENGINEERING

Catalogs and Directories
McGRAW-HILL ELECTRICAL ENGINEERING CATALOG
McGRAW-HILL ELECTRICAL TRADE CATALOG — McGRAW CENTRAL STATION DIRECTORY
KEYSTONE COAL MINING CATALOG — McGRAW ELECTRIC RAILWAY DIRECTORY
KEYSTONE METAL QUARRY CATALOG — METAL QUARRY DIRECTORY
KEYSTONE COAL BUYERS CATALOG — COAL FIELD DIRECTORY
BONBRIGHT SURVEY OF ELECTRIC POWER & LIGHT COMPANIES IN THE U. S.

Radio
RADIO RETAILING
Transportation
BUS TRANSPORTATION
ELECTRIC RAILWAY JOURNAL
Mining
COAL AGE
COAL AGE NEWS
ENGINEERING & MINING JOURNAL
Overseas
INGENIERIA INTERNACIONAL
AMERICAN MACHINIST (EUROPEAN EDITION)

49,000 PAGES USED ANNUALLY BY 3,500 INDUSTRIAL ADVERTISERS TO HELP INDUSTRY BUY MORE INTELLIGENTLY

Do you use pneumatic tires?

This is the rim for them



GOODYEAR Type K Rim Equipment marks a new era in rim design—an epochal advance in tire usage for truck and bus transportation.

Goodyear offers *truck and bus manufacturers* co-operation in any kind of test. Our exhaustive tests already made point to this rim as factory equipment for pneumatic-tired trucks and buses of the future.

Truck and bus owners and operators who are contemplating a changeover from solid to pneumatic tires — single or dual rears — will find this equipment exactly what they need to do the job efficiently, economically and in the most practical way.

Every truck dealer and tire dealer should learn the advantages offered in this new equipment. Rim distributors will co-operate with you in adapting wheels.

Goodyear Type K Rims offer these decided advantages:

1. Simplicity and ease of operation in tire changing.
2. Adaptability to all types of wheels—single or dual.
3. Lightness with strength.
4. Economy of replacement.
5. Reduction of brake-drum heat through use of ventilated wheels, thus saving of tires.

Made in but two parts—one endless section and one split section. Makes all pneumatic tires quickly detachable as well as *demountable at the rim.* Offered in a complete range of sizes.

Developed by Goodyear engineers, made exclusively in Goodyear shops, widely accessible through rim distributors. "The Greatest Name in Rubber" guarantees your permanent satisfaction.

Write Goodyear, Akron, Ohio, or Los Angeles, California, for illustrated booklet and complete information.

GOODYEAR

Copyright 1927, by The Goodyear Tire & Rubber Co., Inc.

Type K Truck & Bus Rim Equipment



Points that Distinguish this Lang City Type All-Metal Frame Body

Clear vision front.

Circulating load that makes it possible to handle crowds at rush hours more quickly.

Single raise sash which gives a lower appearance to a city-type body.

Sash raises eleven inches clear, which is equal to most buses having double sash.

Safety door control at rear end has automatic interlock with brakes.

The Lang all-metal body combines low weight and low maintenance with utmost attractiveness. It is luxurious even for city service.

In every detail of design, mechanical construction and finish, the pioneer work of Lang in the bus body field shows in the Lang Body. No wonder Lang Bodies create new passengers—and hold them.



Through Lang's special department for body maintenance is offered a real and welcome service to bus operators.

A good chassis demands a good body, if the old one is damaged or needs to be replaced by a modern, revenue-earning job.

Lang Craftsmen are experienced in this sort of work. As long as the chassis is in good condition, Lang will take care of the body. The result, to all appearances, is an entirely new bus, modernized and brought up to date.

THE LANG BODY COMPANY, CLEVELAND, OHIO



"After all— it's the Setting that counts!"

The Sterling Mark on Bus Bodies

101 YEARS OF MANUFACTURING EXPERIENCE

Snow sweeper rattan and cane webbing may be ordered through any H-W sales office.



No. 327-M

FOR INTERURBAN NEEDS

THIS Heywood-Wakefield seat is designed for the modern type of interurban service where comfort is now so important. It has been selected for both new cars and for replacement use.

It has deep, double spring cushions shaped to allow more leg freedom. Mechanism rails are set in. The individual backs are properly pitched for comfort.

Our car seating experts will be glad to help you decide on the best seating equipment for your needs. This service is free through any H-W sales office.



If you have not received a copy of our new Bus Seat Catalogue, write for it.

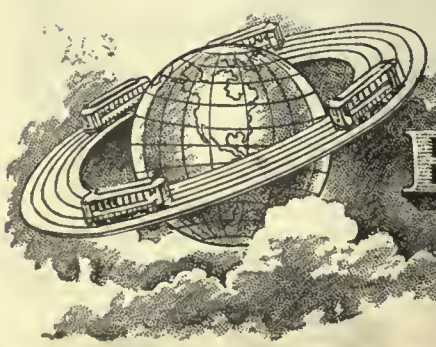
Heywood-Wakefield
REG. U.S. PAT. OFF.



Heywood-Wakefield Co., Wakefield, Mass.; 516 West 34th St., New York, N. Y.; 439 Railway Exchange Bldg., Chicago, Ill. H. G. Cook, Hobart Bldg., San Francisco, Cal. The G. F. Cotter Supply Co., Houston, Texas. F. N. Grigg, 630 Louisiana Ave., Washington, D. C. The Railway & Power Engineering Corp., 133 Eastern Ave., Toronto; Montreal; Winnipeg, Canada.



JUST as the electric railway companies have to compile and be guided by exhaustive statistics as to peak loads, traffic densities, costs per mile, and so forth, we must constantly keep ourselves informed as to purchasing power, density of population and all vital market information in order to maintain our service as an active asset of your service.



Barron G. Collier
INCORPORATED
CANDLER BLDG. NEW YORK

AIR—and air *alone* can absorb and thus practically eliminate road shocks and vibration.

These two destructive forces cost truck and bus operators who ignore them hundreds of thousands of dollars every year in unnecessary maintenance expense and repair bills—



GRÜSS
Sleeve Type
AIR SPRING



WESTINGHOUSE
Piston Type
AIR SPRING

THE SHOCK ELIMINATORS FOR TRUCKS-BUSSES-PASSENGER CARS



AIR Springs float the bus or truck chassis on cushions of air. These air cushions absorb road shocks and vibration, prevent twisting and wrenching of frame, eliminate shifting of load and damage to cargo, insure supreme riding comfort regardless of road conditions.

Thousands of truck and bus operators in all parts of the world have found the savings thus effected make air springs the greatest dividend payer they have in connection with their equipment.

The CLEVELAND PNEUMATIC TOOL COMPANY
Cleveland, Ohio

ANNUAL

Statistical and *Forecast* *Number*

Electric Railway Journal
January 14, 1928

This important number will contain:

Record of 1927 in costs and revenues.

Number of cars purchased.

Miles of track constructed and reconstructed.

Financial records for 1927.

Reviews of basic tendencies in legal, financial and regulatory matters.

A review of the significant news developments of 1927.

Together with:

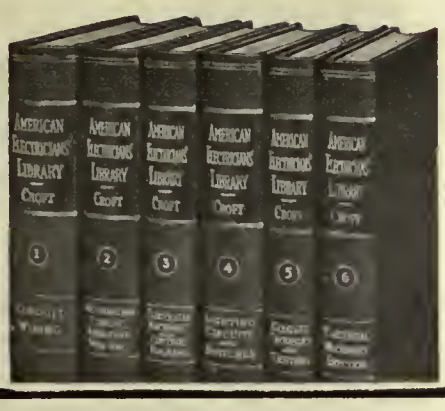
A forecast of 1928 expenditures in all departments, and the trends which will shape developments and progress of 1928.

Advertising forms close January 3, 1928

Electric Railway Journal
Tenth Ave. at 36th St., New York City

Member ABC

Member ABP



ACT NOW—before this special offer expires!

OUR special introductory price on the American Electricians' Library, and the offer of a free copy of Braymer and Roe's "Rewinding Small Motors," will soon be withdrawn. Take advantage of this opportunity to put a substantial saving in your pocket and *order now.*

American Electricians' Library

6 volumes—Over 2,000 pages—fully illustrated

Terrell Croft's books on practical electricity are known and respected by experienced electricians throughout the world. This latest Croft Library is packed full of practical data, diagrams, kinks, short cuts, helps—to supplement his previous books. These six books are written especially to help wiremen, trouble shooters, maintenance men, armature winders and electrical contractors.

The Whole Field Covered

The six books cover the whole wiring field. They give you concrete, usable details about new and better ways of armature winding, conduit wiring, circuit testing, etc., telling you what experience has proved to be best, showing you what to look out for, what to avoid—outlining for you, step by step, the surest, quickest ways of locating troubles and of remedying them.

Over a Thousand Wiring Diagrams

The thousand wiring diagrams in these six books are alone worth the price of the entire library to any practical electrician. Many of these diagrams are unobtainable elsewhere; many more are very hard to get from any other source; all of them are much clearer and more helpful than most wiring diagrams available. These wiring diagrams alone make Croft's American Electricians' Library a great set of books.

Free Examination—Small Monthly Payments

No money down—small monthly payments

Fill in and mail the coupon below and we will send you the six volumes of Croft's AMERICAN ELECTRICIANS' LIBRARY for ten days' Free Examination. We take all the risk—pay all the charges. You assume no obligation of any kind. If you find the books to be what you want and decide to keep them, send us $2.00 in ten days. The balance you pay at the rate of $2.00 a month until the Special Introductory Price of $16.00 has been paid. Upon receipt of your first payment we will send you, free, a copy of Braymer and Roe's "Rewinding Small Motors."



FREE —if you act NOW!

McGRAW-HILL

FREE EXAMINATION COUPON

McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York.

Gentlemen:—Please send me the CROFT AMERICAN ELECTRICIANS' LIBRARY (shipping charges prepaid), for 10 days' free examination. If satisfactory, I will send $2.00 in ten days and $2.00 a month until the special price of $16.00 has been paid. If not wanted I will write you for return shipping instructions. When my first payment of $2.00 is received you are to send me my free copy of Braymer and Roe's REWINDING SMALL MOTORS.

Name .....

Home Address .....

City ..... State .....

Position .....

Name of Company E-12-10-27

FOR SAFETY FROM FIRE INSTALL THE

IMPROVED *Pyrene* TRADE MARK FIRE EXTINGUISHER

Safety demands that every car or bus be equipped with a *Pyrene* Fire Extinguisher. The riding public expect and are entitled to the protection from fire which this extinguisher assures.

Aside from the protection from fire afforded by such installation, to both rolling stock, operator and passengers, the schedule of the Central Traction and Lighting Bureau specifies a charge of 5¢ on motor buses, 3¢ on interurban and 1¢ on urban cars, for the absence of fire extinguishers.



The slight outlay involved by having rolling stock equipped with an Improved *Pyrene* (one-quart) Fire Extinguisher should be regarded as an investment—a device that helps make safety from fire certain should be popular.

Safety adds to the revenue of the operating company by inspiring confidence in the riding public toward modern transportation.

Many of the leading Public Service Corporations recognize this and have equipped their cars and buses with *Pyrene* Fire Extinguishers—they know a burning car or bus need not be abandoned if a *Pyrene* Fire Extinguisher is at hand.

For the protection of electrical equipment, power houses, car barns, shops and storerooms *Pyrene* (1½ quart) Fire Extinguishers are dependable in every emergency.

PYRENE MANUFACTURING CO.
NEWARK, N. J.

"Fortify for Fire Fighting"

Bankers and Engineers

Ford, Bacon & Davis
Incorporated
Engineers
115 Broadway, New York
PHILADELPHIA CHICAGO SAN FRANCISCO

The J. G. White Engineering Corporation
Engineers—Constructors
Oil Refineries and Pipe Lines, Steam and Water Power Plants, Transmission Systems, Hotels, Apartments, Office and Industrial Buildings, Railroads.
43 Exchange Place New York

STONE & WEBSTER
Incorporated
Design and Construction
Examinations Reports Appraisals
Industrial and Public Service Properties
NEW YORK BOSTON CHICAGO

THE BEELER ORGANIZATION
Transportation, Traffic, Operating Surveys
Better Service—Financial Reports
Appraisals—Management
52 Vanderbilt Ave. New York

SANDERSON & PORTER
ENGINEERS
PUBLIC UTILITIES & INDUSTRIALS
Design Construction Management
Examinations Reports Valuations
CHICAGO NEW YORK SAN FRANCISCO

ENGELHARDT W. HOLST
Consulting Engineers
Appraisals Reports Rates Service Investigations
Studies on Financial and Physical Rehabilitation
Reorganization Operation Management
683 Atlantic Ave., BOSTON, MASS.

ALBERT S. RICHEY
ELECTRIC RAILWAY ENGINEER
WORCESTER, MASSACHUSETTS
REPORTS - APPRAISALS - RATES - OPERATION - SERVICE

LINN & MARSHALL, *Inc.*
Financing — Engineering — Management
PUBLIC UTILITIES
ELECTRIC RAILWAYS — MOTOR BUSES —
GAS — ELECTRIC
25 Broadway, New York City

C. B. BUCHANAN, President — W. H. PRICE, JR., Sec'y-Treas. — JOHN F. LAYNG, Vice-President
BUCHANAN & LAYNG CORPORATION
Engineering and Management, Construction
Financial Reports, Traffic Surveys
and Equipment Maintenance
BALTIMORE, 1004 Citizens National Bank Bldg. — Phone: Hanover: 2142 — NEW YORK, 49 Wall Street

DAY & ZIMMERMANN, INC.
ENGINEERS
DESIGN - CONSTRUCTION - REPORTS
VALUATIONS - MANAGEMENT
NEW YORK PHILADELPHIA CHICAGO

HEMPHILL & WELLS
CONSULTING ENGINEERS
Gardner F. Wells Albert W. Hemphill
APPRAISALS
INVESTIGATIONS COVERING
Reorganization Management Operation Construction
43 Cedar Street, New York City

STEVENS & WOOD
INCORPORATED
ENGINEERS AND CONSTRUCTORS
120 BROADWAY, NEW YORK
ENGINEERING CONSTRUCTION — YOUNGSTOWN, O. — FINANCING MANAGEMENT

KELKER, DeLEUW & CO.
CONSULTING ENGINEERS
REPORTS ON
Operating Problems Valuations Traffic Surveys
111 W. Washington Street, Chicago, Ill.

McCLELLAN & JUNKERSFELD
Incorporated
ENGINEERING AND CONSTRUCTION
Examinations—Reports—Valuations
Transportation Problems—Power Developments
68 Trinity Place, New York
Chicago St. Louis

E. H. FAILE & CO.
Designers of
Garages— Service Buildings—Terminals
441 LEXINGTON AVE. NEW YORK

WALTER JACKSON
Consultant on Fares and Motor Buses
The Weekly and Sunday Pass—Differential Fares—Ride Selling
Holbrook Hall 5-W-3
160 Gramatan Ave., Mt. Vernon, N. Y.

THE BABCOCK & WILCOX COMPANY

85 Liberty Street, New York

Builders since 1868 of Water Tube Boilers of continuing reliability

BRANCH OFFICES

Boston, 80 Federal Street
Philadelphia, Packard Building
Pittsburgh, Farmers Deposit Bank Building
Cleveland, Guardian Building
Chicago, Marquette Building
Cincinnati, Traction Building
Atlanta, Candler Building
Phoenix, Ariz., Heard Building
Dallas, Tex., Magnolia Building
Honolulu, H. T., Castle & Cooke Building
Portland, Ore., Gasco Building

WORKS
Bayonne, N. J.
Barberton, Ohio

Makers of Steam Superheaters since 1898 and of Chain Grate Stokers since 1893

BRANCH OFFICES

Detroit, Ford Building
New Orleans, 344 Camp Street
Houston, Texas, Electric Building
Denver, 444 Seventeenth Street
Salt Lake City, Kearns Building
San Francisco, Sheldon Building
Los Angeles, Central Building
Seattle, L. C. Smith Building
Havana, Cuba, Calle de Aguiar 104
San Juan, Porto Rico, Royal Bank Building

THE P. EDWARD WISH SERVICE

50 Church St. NEW YORK — *Street Railway Inspection* DETECTIVES — 131 State St. BOSTON

Byllesby Engineering & Management Corporation

231 S. La Salle Street, Chicago

New York — San Francisco

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

Hale and Kilburn SEATS

Better Quality Seats For Cars and Buses

Hale-Kilburn Co.
1800 Lehigh Ave., Philadelphia, Pa.

RAIL GRINDERS AND WELDERS

Railway Track-work Co., Philadelphia

682

ILLINOIS MOTIVE EQUIPMENT COMPANY

J. D. Elsom, President

General Sales Agent—The Air Rectifier
District Representatives
Johnson Fare Box; McCloskey Bomb Shell Torch; Cinch Vertical Swipe; Fyr-Fly Spot Light

35 E. Wacker Drive — Chicago, Illinois

Hubbard and COMPANY
Pittsburgh Oakland Chicago

UNA RAIL JOINTS
DYNAMOTORS
WELDING ROD
UNA Welding & Bonding Co.
Cleveland, Ohio.

PS HEATERS

Car Heating and Ventilating

—are no longer operating problems. We can show you how to take care of both with one equipment. The Peter Smith Forced Ventilation Hot Air Heater will save, in addition, 40% to 60% of the cost of any other car heating and ventilating system. Write for details.

The Peter Smith Heater Company
6209 Hamilton Ave., Detroit, Mich.



Boyerized Parts:

Brake Pins
Brake Hangers
Brake Levers
Pedestal Gibs
Brake Fulcrums
Turnbuckles
Center Bearings
Side Bearings
Spring Post Bushings
Spring Posts
Bolster and Transom Chafing Plates
Manganese Brake Heads
Manganese Truck Parts
Bushings
Bronze Bearings
McArthur Turnbuckles

Can be purchased through the following representatives:

Economy Electric Devices Co.
72 W. Van Buren St., Chicago, Ill.
F. F. Bodler,
903 Monadnock Bldg., San Francisco, Cal.
W. F. McKenney,
54 First Street, Portland, Oregon.
J. H. Denton,
1328 Broadway, New York City, N. Y.
A. W. Arlin,
510 Delta Bldg., Los Angeles, Cal.

Bemis Car Truck Company
Springfield, Mass.

TULC A LUBRICANT

We make a specialty of

ELECTRIC RAILWAY LUBRICATION

We solicit a test of TULC on your equipment

The Universal Lubricating Co.

Cleveland, Ohio

Chicago Representatives: Jameson-Ross Company, Straus Bldg.



Structural Shapes · Steel Sheet Piling
Plates · Skelp
Bars and Bar Mill Products
Bands · Hoops
Axles · Wrought Steel Wheels
Rails · Rail Joints
Steel Cross Ties

CARNEGIE STEEL COMPANY
General Offices · Carnegie Building · 434 Fifth Avenue
PITTSBURGH PENNSYLVANIA

1839

Why



Le Carbone? Carbon Brushes?

Reason No. 17

Their uniform and efficient commutating qualities prevent overheating which ordinarily causes brushes to break and chip. Flash-overs are thus avoided and commutators protected.

They talk for themselves

W. J. Jeandron
Factory Terminal Bldg.
Fifteenth Street, Hoboken, N. J.
Pittsburgh Office: 634 Wabash Bldg.
Chicago Office: 1657 Monadnock Block
San Francisco Office: 525 Market Street
Canadian Distributors: Lyman Tube & Supply Co., Ltd.
Montreal and Toronto

COLUMBIA
1892
MACHINE WORKS

COLUMBIA

Railway Supplies and Equipment

Machine and Sheet Metal Work

Forgings Special Machinery and Patterns

Grey Iron and Brass Castings

Armature and Field Coils.

The Columbia Machine Works *and M. I. Co.*
265 Chestnut St., corner Atlantic Ave.,
Brooklyn, New York



JOHNSON FARE COLLECTING SYSTEMS

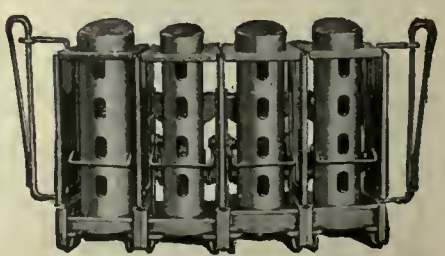


Johnson Electric Fare Boxes and overhead registers make possible the instantaneous registering and counting of every fare. Revenues are increased 1½ to 5% and the efficiency of one-man operation is materially increased. Over 4000 already in use.

When more than two coins are used as fare, the Type D Johnson Fare Box is the best manually operated registration system. Over 50,000 in use.

Johnson Change-Makers are designed to function with odd fare and metal tickets selling at fractional rates. It is possible to use each barrel separately or in groups to meet local conditions. Each barrel can be adjusted to eject from one to five coins or one to six tickets.





Johnson Fare Box Co.
4619 Ravenswood Ave., Chicago, Ill.

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.

Positions Vacant and all other classifications, 8 cents a word, minimum charge $2.00.

Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.

Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

1 to 3 inches.....$4.50 an inch
4 to 7 inches..... 4.30 an inch
8 to 14 inches..... 4.10 an inch

Rates for larger spaces, or yearly rates, on request.

An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

THE public auction of the Traction and Electric Light properties of the Binghamton Railway Company was postponed on December 1st, 1927 to January 5th, 1928 at 2:30 o'clock P.M. at the offices of the corporation, No. 375 State Street, Binghamton, N. Y., at which time the property will be sold.

WILLIAM H. RILEY, *Special Master to Sell*
561 O'Neil Bldg., Binghamton, N. Y.

Searchlight Results:

Equipment For Sale:

"Our advertisement in the Electric Railway Journal located a buyer, and I have disposed of the car in question."

President—Buffalo Industrial Plant.

"We have disposed of all of our Girder Rails advertised in your paper. We are frank to tell you that the meterial went to three different traction lines and represents three separate and distinct new accounts. Our idea is that when it comes to bringing something to buyers in the traction field, there is but one sheet, and that is yours."

Dealer—New York City.

"There is no necessity for the continuation of this advertisIng, for the reason that we could have sold this equipment five times over from the advertisement that was run one time."

Superiotendent—A Pennsylvania Railway Co.

Equipment Wanted:

"The two insertions of this advertisement which you displayed in admirable manner were sufficieot to obtain for us the exact equipment that we desired."

Superintendent—A New England Railway Co.

Positions Vacant:

"The strongest proof that your Searchlight Department finds its way to many readers is shown by the numerous letters we have received in answer to our recent advertisement."

Secretary—A Connecticut Railway Co.

"You gave us one good man as a result of a similar advertisement in the Electric Railway Journal some time ago. Please give us another."

Proprietor of Steel Sales Agency.

Positions Wanted:

"The result of advertising in the Searchlight Section of your Electric Railway Journal I have secured a position with The —— Traction Co. of W. Va."

"I received 8 replies and accepted a position with the —— Railway Co. with over 30% increase in salary."

Business Opportunity:

"Advertisement for investment to develop or acquire Traction Light & Pr. The results from the advertisement in Electric Railway Journal have been satisfactory."

New York City Attorney.

POSITION WANTED

ADVERTISING man for city and interurban electric railway in the East. P-63, Electric Railway Journal, Tenth Ave. at 36th St., New York.

POSITIONS WANTED

A TECHNICALLY trained engineer with eleven years' experience studying schedules, traffic conditions and operating methods, desires to make a change. PW-67, Electric Railway Journal, 1600 Arch St., Philadelphia, Pa.

GENERAL superintendent or manager; fifteen years' successful experience. PW-55, Electric Railway Journal, Tenth Ave. at 36th St., New York.

MAN with wide experience in trolley and bus maintenance open for engagement; references. PW-64, Electric Railway Journal, Tenth Ave. at 36th St., New York.

SUPERINTENDENT, fifteen years' experience in city, interurban and bus transportation in foreign countries and United States; can speak Spanish. PW-68, Electric Railway Journal, Tenth Avenue at 36th St., New York.

WANTED

MOTORS

14—Second-hand Westinghouse 532 S.B: Motors.

The Stenbenville, East Liverpool & Beaver Valley Traction Company
East Liverpool, Ohio

WANTED

WHEEL GRINDER

New or second-hand desired by Southern property for immediate use; state condition, manufacturer's name, and price.

W-69 Electric Railway Journal
1600 Arch St., Phila., Pa.

FOR SALE

15 BIRNEY SAFETY CARS

Brill Built

West, 508 or G. E. 264 Motors
Cars Complete—Low Price—Fine Condition
ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

SEARCHLIGHT SERVICE SECURES SATISFACTORY SALES

We buy entire Railways and Power Plants

H. E. SALZBERG COMPANY, Inc.
225 Broadway New York City

We sell Street Railway and Power equipment

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Brakes
General Electric Co.
Westinghouse Air Brake Co.

Air Springs
Cleveland Pneumatic Tool Co.

Anchors, Guy
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M Co.

Armature Shop Tools
Columbia Machine Works
Elec. Service Supplies Co.

Automatic Return Switch Stands
Ramapo Ajax Corp.

Automatic Safety Switch Stands
Ramapo Ajax Corp.

Axles
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Cincinnati Car Co.
Illinois Steel Co.
St. Louis Car Co.
Standard Steel Works
Westinghouse E. & M. Co.

Axles (Front & Rear) Motor Truck & Passenger Car
Timken-Detroit Axle Co.

Axles, Trailer & Motor Bus
Timken-Detroit Axle Co.

Babbitting Devices
Columbia Machine Works & M. I. Co.

Badges and Buttons
Elec. Service Supplies Co.
International Register Co.

Batteries, Dry
Nichols-Lintern Co.

Bearings and Bearing Metals
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
St. Louis Car Co.
Westinghouse E. & M. Co.

Bearings, Center and Roller Side
Cincinnati Car Co.
Columbia Machine Works
Stucki Co., A.

Bearings, Roller
Timken Roller Bearing Co.

Bells and Buzzers
Consolidated Car Heating Co.

Bells and Gongs
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
St. Louis Car Co.

Benders, Rail
Railway Trackwork Co.

Body Material, Haskelite Plymetl
Haskelite Mfg. Corp.

Bodies, Bus
Brill Co., The J. G
Cummings Car & Coach Co.
Lang Body Co.
St. Louis Car Co.

Boilers
Babcock & Wilcox Co.

Bolts & Nuts, Track
Illinois Steel Co.

Bond Testers
American Steel & Wire Co.
Electric Service Supplies Co.

Bonding Apparatus
American Steel & Wire Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.

Bonds, Rail
American Steel & Wire Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Book Publishers
McGraw-Hill Book Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, etc.)
Bates Expanded Steel Truss Co.
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Brill Co., The J. G
Cincinnati Car Co.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
American Brake Shoe & Foundry Co.
Bemis Car Truck Co.
Brill Co., The J. G.
St. Louis Car Co.
Taylor Electric Truck Co.

Brake Testers
National Ry. Appliance Co.

Brakes, Brake Systems and Brake Parts
Bemis Car Truck Co
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
General Electric Co.
National Brake Co.
Safety Car Devices Co.
St. Louis Car Co.
Westinghouse Tr. Br. Co.

Brakes, Magnetic Rail
Cincinnati Car Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
LeCarbone Co.
Westinghouse E. & M. Co.

Brushholders
Columbia Machine Works
General Electric Co.

Bulkheads
Haskelite Mfg. Corp.

Buses
Cummings Car & Coach Co.
General Electric Co.

Bus Lighting
National Ry. Appliance Co.

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works
St. Louis Car Co.

Cables (See Wires and Cables)

Cambric Tapes, Yellow and Black Varnish
General Electric Co.
Irvington Varnish & Ins. Co.

Carbon Brushes (See Brushes, Carbon)

Car Lighting Fixtures
Elec. Service Supplies Co.

Car Panel Safety Switches
Consolidated Car Heating Co.
Westinghouse E. & M. Co.

Car Steps, Safety
Cincinnati Car Co.

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Cars, Dump
Brill Co., The J. G.
Differential Steel Car Co.
St. Louis Car Co.

Cars, Gas-Electric
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co.

Cars, Gas, Rail
Brill Co., The J. G.
St. Louis Car Co.

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Cincinnati Car Co.
Cummings Car & Coach Co.
Kuhlman Car Co., G. C.
St. Louis Car Co.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Cars, Self-Propelled
Brill Co., The J. G.

Castings, Brass Composition or Copper
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.

Castings, Gray Iron and Steel
American Brake Shoe & Fdry.
American Steel Foundries
Bemis Car Truck Co.
Columbia Machine Works & M. I. Co.
St. Louis Car Co.
Standard Steel Works

Castings, Malleable & Brass
American Brake Shoe & Foundry Co.
Bemis Car Truck Co.
Columbia Machine Works & M. I. Co.
St. Louis Car Co.

Catchers and Retrievers, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.

Ceiling Car
Haskelite Mfg. Corp.

Ceilings Plywood Panels
Haskelite Mfg. Corp.

Chairs, Parlor Car
Heywood Wakefield Co.

Change Carriers
Cleveland Fare Box Co.
Electric Service Supplies Co.

Change Trays
Cincinnati Car Co.

Circuit-Breakers
General Electric Co.
Westinghouse E. & M. Co.

Clamps and Connectors for Wires and Cables
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Cleaners and Scrapers Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
Long Mfg. Co.

Cinches

Coil Banding and Winding Machines
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

Coils, Armature and Field
Columbia Machine Works & M. I. Co.
General Electric Co.
Westinghouse E. & M. Co.

Coils, Choke and Kicking
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Coin Changers
Illinois Motive Equip. Co.
Johnson Fare Box Co.

Coin Counting Machines
Cleveland Fare Box Co.
International Register Co.
Johnson Fare Box Co.

Coin Sorting Machines
Cleveland Fare Box Co.
Johnson Fare Box Co.

Coin Wrappers
Cleveland Fare Box Co.

Commutator Slotters
Columbia Machine Works
Elec. Service Supplies Co.
Westinghouse E. & M. Co.
Wood Co., Chas. N.

Commutators or Parts
Columbia Machine Works & M. I. Co.
General Electric Co.
Westinghouse E. & M. Co.

Compressors, Air
General Electric Co.
Westinghouse Tr. Br. Co.

Condensers
General Electric Co.
Westinghouse E. & M. Co.

Condenser Papers
Irvington Varnish & Ins. Co.

Connectors, Solderless
Westinghouse E. & M. Co.

Connectors, Trailer Car
Columbia Machine Works
Consolidated Car Heating Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Controllers or Parts
Columbia Machine Works & M. I. Co.
General Electric Co.
Westinghouse E. & M. Co.

Controller Regulators
Elec. Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse E. & M. Co.

Converters, Rotary
General Electric Co.
Westinghouse E. & M. Co.

Copper Wire
American Brass Co.
American Steel & Wire Co.
Anaconda Copper Mining Co.

Copper Wire Instruments, Measuring, Testing and Recording
American Brass Co.
Anaconda Copper Mining Co.

Cord, Bell, Trolley, Register
American Steel & Wire Co.
Brill Co., The J. G.
Elec. Service Supplies Co.
International Register Co.
Roebling's Sons Co., John A.
St. Louis Car Co.
Samson Cordage Works
Silver Lake Co.

Cord Connectors and Couplers
Elec. Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
American Steel Foundries
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
Ohio Brass Co.
Westinghouse Traction Brake Co.

Cowl Ventilators
Nichols-Lintern Co.

Cranes, Hoists & Lifts
Electric Service Supplies Co.

Cross Arms (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossings
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Frogs & Switches
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Track (See Track Special Work)

Crossings, Trolley
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Curtains & Curtain Fixtures
Brill Co., The J. G
Edwards Co., O. M.
St. Louis Car Co.

Cutting Apparatus
Electric Railway Improvement
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse Electrical & Mfg. Co.

Dealer's Machinery & Second Hand Equipment
Electric Equipment Co.
Salzberg, Inc., H. E.

Derailing Devices (See also Track Work)

Derailing Switches
Ramapo Ajax Corp.

Destination Signs
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.

Detective Service
Wish-Service, P. Edward

Door Operating Devices
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Heating Co.
National Pneumatic Co.
Safety Car Devices Co.

Doors & Door Fixtures
Brill Co., The J. G.
Cincinnati Car Co.
Edwards Co., O. M.
Hale-Kilburn Co.
St. Louis Car Co.

Doors, Folding Vestibule
National Pneumatic Co.
Safety Car Devices Co.

Drills, Track
American Steel & Wire Co.
Electric Service Supplies Co.
Ohio Brass Co.

Dryers, Sand
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Ears
Columbia Machine Works & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Electric Grinders
Railway Trackwork Co.

Electric Rivet Heaters
American Car & Fdry. Co.

Electrical Wires and Cables
Amer. Electrical Works.
American Steel & Wire Co.
John A. Roebling's Sons Co.

Electrodes, Carbon
Railway Trackwork Co.
Una Welding & Bonding Co.

Electrodes, Steel
Railway Trackwork Co.
Una Welding & Bonding Co.

Enamel
Du Pont de Nemours & Co., E. I.

Engineers, Consulting, Contracting and Operating
Beeler, John A.
Byllesby Co., H. M.
Day & Zimmermann, Inc.
Falls & Co., E. H.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & DeLeuw
Linn & Marshall Co.
McClellan & Junkersfeld
Richey, Albert S.
Sanderson & Porter
Stevens & Wood
Stone & Webster Co.
White Eng. Corp., The J. G

Engines, Gas, Oil or Steam
Westinghouse E. & M. Co

Exterior Side Panels
Haskelite Mfg. Corp.

Fare Boxes
Cleveland Fare Box Co.
Illinois Motive Equip. Co.
Johnson Fare Box Co.
Perey Mfg. Co.

Fare Registers
Electric Service Supplies Co.
Johnson Fare Box Co.

Fences, Woven Wire & Fence Posts
American Steel & Wire Co.

Fenders and Wheel Guards
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Fender Co
St. Louis Car Co.
Star Brass Works
Wood Co., Chas. N.

Fibre and Fibre Tubing
Westinghouse E. & M. Co.

Field Coils (See Coils)

Fire Extinguishers
Pyrene Mfg. Co.

Floodlights
Electric Service Supplies Co
General Electric Co.

Floor, Sub
Haskelite Mfg. Corp.

Floors
Haskelite Mfg. Corp.

Forgings
Brill Co., The J. G.
Cincinnati Car Co.
Standard Steel Works

Frogs & Crossings, Tee Rail
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Frogs, Track (See Track Work)

Frogs, Trolley
Electric Service Supplies Co
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Fuses and Fuse Boxes
Columbia Machine Works & M. I. Co.
Consolidated Car Heating Co.
General Electric Co.
Westinghouse E. & M. Co

Gas Electric Drive for Buses
General Electric Co.

(Continued on page 42)

TISCO
MANGANESE STEEL
SPECIAL TRACKWORK

Wharton *Tisco* Manganese Steel Trackwork will help you hold the up-keep down.

WM. WHARTON JR. & CO., INC.
Easton, Penna.

B. A. HEGEMAN, Jr., President H. A. HEGEMAN, First Vice-Pres. and Treas
F. T. SARGENT, Secretary W. C. PETERS, Vice-Pres. Sales and Engineering

National Railway Appliance Co.
Graybar Building, 420 Lexington Ave., New York
BRANCH OFFICES
Munsey Bldg., Washington, D. C. 100 Boylston St., Boston, Mass.
Hegeman-Castle Corporation, Railway Exchange Building, Chicago, Ill.

RAILWAY SUPPLIES

Tool Steel Gears and Pinions
Anglo-American Varnish Co., Varnishes, Enamels, etc.
National Hand Holds
Genesco Paint Oils
Dunham Hopper Door Device
Garland Ventilators
Walter Tractor Snow Plows
Feasible Drop Brake Staffs
Ft. Pitt Spring & Mfg. Co., Springs
Flaxlinum Insulation
Economy Electric Devices Co. Power Saving and Inspection Meters
National Safety Devices Company's Whistle Blowers, Gong Ringers and Brake Hangers
Godward Gas Generators
Cowdry Automotive Brake Testing Machine

"STANDARD"
STEEL PRODUCTS
"S"
Steel Axles Steel Springs
Armature Shafts
Rolled Steel Wheels
STANDARD STEEL WORKS COMPANY
PHILADELPHIA, PA.
BRANCH OFFICES
CHICAGO NEW YORK PORTLAND SAN FRANCISCO ST. LOUIS
PITTSBURGH HOUSTON RICHMOND ST. PAUL MEXICO CITY
WORKS BURNHAM, PA.

Kalamazoo Trolley Wheels

The value of Kalamazoo Trolley Wheels and Harps has been demonstrated by large and small electric railway systems for a period of thirty years. Being exclusive manufacturers, with no other lines to maintain, it is through the high quality of our product that we merit the large patronage we now enjoy. With the assurance that you pay no premium for quality we will appreciate your inquiries.



THE STAR BRASS WORKS
KALAMAZOO, MICH., U. S. A.

Lorain Special Trackwork
Girder Rails

Electrically Welded Joints

THE LORAIN STEEL COMPANY
Johnstown, Pa.
Sales Offices:
Atlanta Chicago Cleveland New York
Philadelphia Pittsburgh Dallas
Pacific Coast Representative:
United States Steel Products Company
Los Angeles Portland San Francisco Seattle
Export Representative:
United States Steel Products Company, New York, N. Y.

THE WORLD'S STANDARD
"IRVINGTON"
Black and Yellow
Varnished Silk, Varnished Cambric, Varnished Paper
Irv-O-Slot Insulation Flexible Varnished Tubing
Insulating Varnishes and Compounds

Irvington Varnish & Insulator Co.
Irvington, N. J.

Sales Representatives:
Mitchell-Rand Mfg. Co., N. Y. Prehler Brothers Inc., Chicago
E. M. Wolcott, Rochester White Supply Co., St. Louis
I. W. Levine, Montreal Clapp & LaMoree, Los Angeles
A. L. Gillies, Toronto Martin Woodard, Seattle
Consumers' Rubber Co., Cleveland

ELRECO TUBULAR POLES



COMBINE
Lowest Cost Lightest Weight
Least Maintenance Greatest Adaptability

Catalog complete with engineering data sent on request.

ELECTRIC RAILWAY EQUIPMENT CO.
CINCINNATI, OHIO
New York City, 30 Church Street

Gaskets
Westinghouse Tr. Br. Co.

Gas Producers
Westinghouse E. & M. Co

Gates, Car
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.

Gear Blanks
Brill Co., The J. G.
Standard Steel Works

Gear Cases
Chillingworth Mfg. Co.
Columbia Machine Works & M. I. Co.
Electric Service Supplies Co
Westinghouse E. & M. Co.

Gears and Pinions
Bemis Car Truck Co.
Columbia Machine Works & M. I. Co.
Electric Service Supplies Co
General Electric Co.
Nat'l Ry. Appliance Co.
R. D. Nuttall Co.
Tool Steel Gear & Pinion Co.

Generators
General Electric Co.
Westinghouse E. & M. Co.

Girder Rails
Bethlehem Steel Co.
Lorain Steel Co.

Gongs (See Bells and Gongs)

Greases (See Lubricants)

Grinders, Portable
Railway Trackwork Co.

Grinders, Portable Electric
Railway Trackwork Co.

Grinding Bricks and Wheels
Railway Trackwork Co.

Guard Rail Clamps
Ramapo Ajax Corp.

Guard Rails, Tee Rail & Manganese
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Guards, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.

Harps, Trolley
Columbia Machine Works
Elec. Service Supplies Co.
R. D. Nuttall Co.
Star Brass Works

Headlights
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

Headlining
Columbia Machine Works & M. I. Co.
Haskelite Mfg. Corp.

Heaters, Bus
Nichols-Lintern Co.

Heaters, Car (Electric)
Consolidated Car Heating Co.
Gold Car Heat. & Ltg. Co.
Railway Utility Co.
Smith Heater Co., Peter

Heaters, Car, Hot Air and Water
Smith Heater Co., Peter

Heaters, Car Stove
Smith Heater Co., Peter

Heaters, Electric Rivet
American Car & Fdry. Co.

Helmets, Welding
Railway Trackwork Co.
Una Welding & Bonding Co.

Hoists & Lifts
Columbia Machine Works & M. I. Co.

Hose, Bridges
Ohio Brass Co.

Hose, Pneumatic
Westinghouse Traction Brake Co.

Instruments, Measuring, Testing and Recording
American Steel & Wire Co.
General Electric Co.
National Ry. Appliance Co.
Westinghouse E. & M. Co.

Insulating Cloth, Paper and Tape
General Electric Co.
Irvington Varnish & Ins. Co.
Okonite Co.
Okonite-Caliender Cable Co.
Westinghouse E. & M. Co.

Insulating Silk
Irvington Varnish & Ins. Co.

Insulating Varnishes
E. I. Du Pont de Nemours Co.
Irvington Varnish & Ins. Co.

Insulation (See also Paints)
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
Irvington Varnish & Ins. Co.
Okonite Co.
Okonite-Callender Cable Co.
Westinghouse E. & M. Co.

Insulation Slots
Irvington Varnish & Ins. Co.

Insulator Pins
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Insulators (See also Line Materials)
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Interior Side Linings
Haskelite Mfg. Corp.

Jacks (See also Cranes, Hoists and Lifts)
Blackhawk Mfg. Co.
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.

Joints, Rail
(See Rail Joints)

Journal Boxes
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.

Lacquer
Du Pont de Nemours & Co., E. I.

Lamp Guards and Fixtures
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

Lamps, Arc & Incandescent (See also Headlights)
General Electric Co.
Westinghouse E. & M. Co.

Lamps, Signal and Marker
Elec. Service Supplies Co.
Nichols-Lintern Co.

Lanterns, Classification
Nichols-Lintern Co.

Letter Boards
Cincinnati Car Co.
Haskelite Mfg. Corp.

Lighting Fixtures, Interior
Electric Service Supplies Co.

Lightning Protection
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Line Material (See also Brackets, Insulators, Wires, etc.)
Archbold-Brady Co.
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Locking Spring Boxes
Wm. Wharton, Jr. & Co.

Locomotives, Electric
Cincinnati Car Co.
Cummings Car & Coach Co.
General Electric Co.
St. Louis Car Co.
Westinghouse E. & M. Co.

Lubricating Engineers
Universal Lubricating Co.

Lubricants, Oil and Grease
Universal Lubricating Co.

Manganese Parts
Bemis Car Truck Co.

Manganese Steel Guard Rails
Ramapo Ajax Corp.
Wm. Wharton Jr. & Co.

Manganese Steel, Special Track Work
Bethlehem Steel Co.
Wm. Wharton, Jr. & Co.

Manganese Steel Switches, Frogs and Crossings
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Meters (See Instruments)

Mirrors, Inside & Outside
Cincinnati Car Co.

Motor Buses (See Buses)

Motors, Electric
General Electric Co.
Westinghouse E. & M. Co.

Motor, Generators & Controls for Electric Buses
General Electric Co.

Motorman's Seats
Brill Co., The J. G.
Cincinnati Car Co.
Elec. Service Supplies Co.
Heywood Wakefield Co.
St. Louis Car Co.
Wood Co., Chas. N.

Nuts and Bolts
Bemis Car Truck Co.
Cincinnati Car Co.
Hubbard & Co.

Oils (See Lubricants)

Omnibuses (See Buses)

Oxy-Acetylene (See Cutting Apparatus)

Packing
Westinghouse Traction Brake Co.

Paints and Varnishes (Insulating)
Elec. Service Supplies Co.
Irvington Varnish & Ins. Co.

Paints & Varnishes, Preservative
E. I. Du Pont de Nemours Co.

Paints & Varnishes, Railway
E. I. Du Pont de Nemours Co.
National Ry. Appliance Co.

Panels, Outside, Inside
Haskelite Mfg. Corp.

Paving Material
American Brake Shoe & Fdry.

Pickup, Trolley Wire
Elec. Service Supplies Co.
Ohio Brass Co.

Pinion Pullers
Elec. Service Supplies Co.
Wood Co., Chas. N.

Pinions (See Gears)

Pins, Case Hardened, Wood and Iron
Ohio Brass Co.
Westinghouse Traction Brake Co.

Pipe Fittings
Standard Steel Works
Westinghouse Tr. Brake Co.

Planers (See Machine Tools)

Plates for Tee Rail Switches
Ramapo Ajax Corp.

Pliers, Rubber Insulated
Elec. Service Supplies Co.

Plywood Roofs, Headlinings, Floors, Interior Panels, Bulkheads, Truss Planks
Haskelite Mfg. Corp.

Pole Line Hardware
Bethlehem Steel Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.

Pole Reinforcing
Hubbard & Co.

Poles, Metal Street
Bates Expanded Steel Truss Co.
Elec. Ry. Equipment Co.
Hubbard & Co.

Poles, Ties, Posts, Piling & Lumber
Bell Lumber Co.
Naugle Pole & Tie Co.
J. F. Prettyman & Son

Poles and Ties, Treated
Bell Lumber Co.
J. F. Prettyman & Son

Poles, Trolley
Elec. Service Supplies Co.
R. D. Nuttall Co.

Poles, Tubular Steel
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.

Portable Grinders
Railway Trackwork Co.

Potheads
Okonite Co.
Okonite-Callender Cable Co., Inc.

Power Saving Devices
National Ry. Appliance Co.

Pressings, Special Steel
Cincinnati Car Co.

Pressure Regulators
General Electric Co.
Westinghouse E. & M. Co.
Westinghouse Traction Brake Co.

Punches, Ticket
International Register Co.
Wood Co., Chas. N.

Pyroxylin Finishes
Du Pont de Nemours & Co., E. I.

Radiators
Long Mfg. Co.

Rail Braces and Fastenings
Ramapo Ajax Corp.

Rail Grinders (See Grinders)

Rail Joints
Carnegie Steel Co.
Illinois Steel Co.
Rail Joint Co.

Rail Joints, Welded
Lorain Steel Co.

Rail Welding
Railway Trackwork Co.
Una Welding & Bonding Co.

Rails, Steel
Carnegie Steel Co.
Illinois Steel Co.

Railway Safety Switches
Consolidated Car Heating Co.
Westinghouse E. & M. Co.

Rattan
Brill Co., The J. G.
Cummings Car & Coach Co.
Elec. Service Supplies Co.
Hale-Kilburn Co.
Heywood Wakefield Co.
St. Louis Car Co.

Registers and Fittings
Brill Co., The J. G.
Cincinnati Car Co.
Elec. Service Supplies Co.
International Register Co.
St. Louis Car Co.

Reinforcement, Concrete
American Steel & Wire Co.
Bethlehem Steel Co.
Carnegie Steel Co.

Repair Shop Appliances (See also Coil Banding and Winding Machines)
Elec. Service Supplies Co.

Repair Work (See also Coils)
Westinghouse E. & M. Co.

Replacers, Car
Cincinnati Car Co.
Elec. Service Supplies Co.

Resistances
Consolidated Car Heating Co.
General Electric Co.

Resistance, Wire and Tube
Westinghouse E. & M. Co.

Retrievers, Trolley (See Catchers and Retrievers Trolley)

Rheostats
General Electric Co.
Westinghouse E. & M. Co.

Rivet Heaters, Electric
American Car & Fdry. Co.

Roofing, Car
Haskelite Mfg. Corp.

Roofs, Car and Bus
Haskelite Mfg. Corp.

Safety Control Devices
Safety Car Devices Co.

Sanders, Track
Brill Co., The J. G.
Elec. Service Supplies Co.
Nichols-Lintern Co.
Ohio Brass Co.
St. Louis Car Co.

Sash Fixtures, Car
Brill Co., The J. G.
Cincinnati Car Co.
Edwards Co., O. M.
St. Louis Car Co.

Sash, Metal Car Window
Edwards Co., O. M.
Hale-Kilburn Co.

Scrapers, Track (See Cleaners and Scrapers, Track)

Screw Drivers, Rubber Insulated
Elec. Service Supplies Co.

Seating Materials
Brill Co., The J. G.
Haskelite Mfg. Corp.
Heywood Wakefield Co.
Massachusetts Mohair Plush Co.
St. Louis Car Co.

Seats, Bus
Brill Co., The J. G.
Hale-Kilburn Co.
Heywood Wakefield Co.
St. Louis Car Co.

Seats, Car (See also Rattan)
Brill Co., The J. G.
Cincinnati Car Co.
Hale-Kilburn Co.
Heywood Wakefield Co.
St. Louis Car Co.

Second Hand Equipment
Electric Equipment Co.
Salzberg, Inc., H. E.

Shades, Vestibule
Brill Co., The J. G.
Cincinnati Car Co.

Shock Absorbers
Cleveland Pneumatic Tool Co.

Shop Tools
Blackhawk Mfg. Co.

Shovels
Brill Co., The J. G.
Hubbard & Co.

Shovels, Power
Brill Co., The J. G.

Side Bearings (See Bearings Center and Side)

Signals, Car Starting
Consolidated Car Heating Co.
Elec. Service Supplies Co.
National Pneumatic Co.

Signals, Indicating
Nichols-Lintern Co.

Signal Systems, Block
Elec. Service Supplies Co.
Nachod and United States Electric Signal Co.
Wood Co., Chas. N.

Signal Systems, Highway Crossing
Nachod and United States Electric Signal Co.
Wood Co., Chas. N.

Slack Adjusters (See Brake Adjusters)

Sleet Wheels and Cutters
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
R. D. Nuttall Co.

Smokestacks, Car
Nichols-Lintern Co.

Snow Plows
National Ry. Appliance Co.

Snow-Plows, Sweepers and Brooms
Brill Co., The J. G.
Columbia Machine Works & M. I. Co.
Consolidated Car Fender Co.
Cummings Car & Coach Co.
St. Louis Car Co.

Snow Sweeper, Rattan
J. G. Brill Co.
Heywood Wakefield Co.

Soldering and Brazing Apparatus (See Welding Processes and Apparatus)

Special Adhesive Papers
Irvington Varnish & Ins. Co.

Special Trackwork
Bethlehem Steel Co.
Lorain Steel Co.
Wm. Wharton, Jr. & Co.

Spikes
American Steel & Wire Co.
Illinois Steel Co.

Splicing Compounds
Westinghouse E. & M. Co.

Splicing Sleeves (See Clamps and Connectors)

Springs
National Ry. Appliance Co.

Springs, Car and Truck
American Spiral Spring Co.
American Steel Foundries
American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
Standard Steel Works

Sprinklers, Track and Road
Brill Co., The J. G.
Cummings Car & Coach Co.
St. Louis Car Co.

Steel and Steel Products
American Steel & Wire Co.
Carnegie Steel Co.
Illinois Steel Co.

Steps, Car
Brill Co., The J. G.
Cincinnati Car Co.

Stokers, Mechanical
Babcock & Wilcox Co.
Westinghouse E. & M. Co

Stop Signals
Nichols-Lintern Co.

Storage Batteries (See Batteries, Storage)

Strain Insulators
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Strand
American Steel & Wire Co.
Roebling's Sons Co., J. A

Street Cars (See Cars, Passenger, Freight, Express)
Cummings Car & Coach Co.

Superheaters
Babcock & Wilcox Co.

Sweepers, Snow (See Snow Plows, Sweepers and Brooms)

Switches
General Electric Co.

Switch Stands and Fixtures
Ramapo-Ajax Corp.

Switches, Selector
Nichols-Lintern Co.

Switches and Switchboards
Consolidated Car Heating Co.
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

Switches, Tee Rail
Ramapo-Ajax Corp.

Switches, Track (See Track Special Work

Tampers, Tie
Railway Trackwork Co.

Tapes and Cloths (See Insulating Cloth, Paper and Tape)

Tee Rail Special Track Work
Ramapo-Ajax Corp.

Telephones and Parts
Elec. Service Supplies Co

Telephone & Telegraph Wire
American Steel & Wire Co
American Telephone and Telegraph Co.
John A. Roeblings Sons Co.

(Continued on page 45)

Arc Weld Rail Bonds

AND ALL OTHER TYPES

Descriptive Catalogue Furnished

American Steel & Wire Company

New York Chicago Boston Cleveland Pittsburgh Denver

U. S. Steel Products Co.

San Francisco Los Angeles Portland Seattle

"The Standard for Rubber Insulation"

INSULATED WIRES and CABLES

"Okonite," "Manson," and Dundee "A" "B" Tapes

Send for Handbook

The Okonite Company

The Okonite-Callender Cable Company, Inc.

Factories, PASSAIC, N. J. PATERSON, N. J.

Sales Offices: New York Chicago Pittsburgh St. Louis Atlanta Birmingham San Francisco Los Angeles Seattle

Pettingell-Andrews Co., Boston, Mass.

F. D. Lawrence Electric Co., Cincinnati, O.

Novelty Electric Co., Phila., Pa.

Gen. Rep.: Engineering Materials Limited, Montreal.

Cuban Rep.: Victor O. Mendoza Co., Havana.

HASKELITE ROOFS

Haskelite Manufacturing Corporation,
133 West Washington Street, Chicago

PLYMETL SIDE PANELS

Waterproofed Trolley Cord



Is the finest cord that science and skill can produce
Its wearing qualities are unsurpassed.

FOR POSITIVE SATISFACTION ORDER
SILVER LAKE

If you are not familiar with the quality you will be surprised at its ENDURANCE and ECONOMY.

Sold by Net Weights and Full Lengths

SILVER LAKE COMPANY

Manufacturers of bell, signal and other cords.

Newtonville, Massachusetts

NORTHERN BELL WESTERN
CEDAR POLES

BUTT TREATING ALL GRADES TIES

BELL LUMBER CO., *Minneapolis, Minn.*

ANACONDA from mine to consumer

Rod, Wire and Cable Products

ANACONDA COPPER MINING COMPANY
THE AMERICAN BRASS COMPANY
General Offices - - 25 Broadway, New York

ANACONDA TROLLEY WIRE

AMERICAN ELECTRICAL WORKS — AMELECTRIC — Wires and Cables — PHILLIPSDALE, R.I.

Reg. U. S. Pat. Office

AMELECTRIC PRODUCTS

BARE COPPER WIRE AND CABLE

TROLLEY WIRE

WEATHERPROOF WIRE AND CABLE

PAPER INSULATED UNDERGROUND CABLE

MAGNET WIRE

AMERICAN ELECTRICAL WORKS
PHILLIPSDALE, R. I.

Chicago, 20-32 West Randolph Street.
Cincinnati, Traction Bldg.: New York, 100 E. 42nd St.

Efficient Bus Heating
with
The N-L Venti-Duct Heater

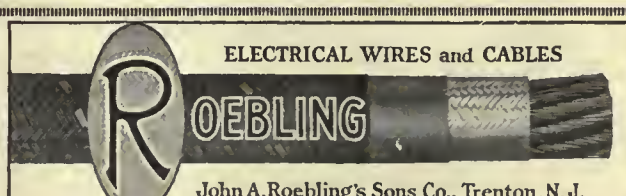
THE NICHOLS-LINTERN CO.
7960 Lorain Ave. Cleveland, Ohio

NAUGLE POLES

WESTERN & NORTHERN CEDAR

NAUGLE POLE & TIE CO.
59 E. MADISON ST. CHICAGO ILL.
New York · Columbus · Kansas City · Spokane · Vancouver · Boston

ELECTRICAL WIRES and CABLES



John A. Roebling's Sons Co., Trenton, N.J.

SAMSON SPOT WATERPROOFED TROLLEY CORD



Trade Mark Reg. U. S. Pat. Off.
Made of extra quality stock firmly braided and smoothly finished
Carefully inspected and guaranteed free from flaws.
Samples and information gladly sent.
SAMSON CORDAGE WORKS, BOSTON, MASS.



Gets Every Fare

PEREY TURNSTILES or PASSIMETERS

Use them in your Prepayment Areas and Street Cars

Perey Manufacturing Co., Inc.
101 Park Avenue, New York City

The DIFFERENTIAL CAR



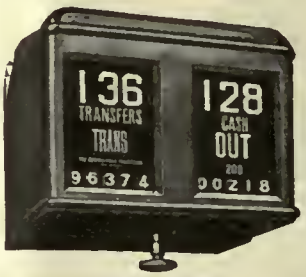
Standard on 60 Railways for

Track Maintenance
Track Construction
Ash Disposal
Coal Hauling
Concrete Materials
Waste Handling
Excavated Materials
Hauling Cross Ties
Snow Disposal

Use These Labor Savers

Differential Crane Car
Clark Concrete Breaker
Differential 3-way Auto Truck Body
Differential Car Wheel Truck and Tractor

THE DIFFERENTIAL STEEL CAR CO., Findlay, O.

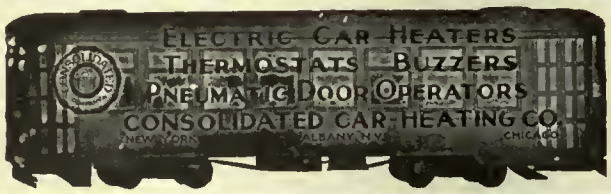


Type R-11
Double Register

International Registers

Made in single and double types to meet requirements of service. For hand or foot, mechanical or electric operation. Counters, car fittings, conductors' punches.

The International Register Co.
15 South Throop Street, Chicago, Illinois



"Bates Poles Outlive the Bond Issues that Buy Them"

BATES POLES AND STRUCTURES

Bates Expanded Steel Truss Co.

General Offices and Plants
EAST CHICAGO, INDIANA, U. S. A.

NACHOD & UNITED STATES SIGNAL CO., INC.
LOUISVILLE, KY.
BLOCK SIGNALS
FOR
ELECTRIC RAILWAYS
HIGHWAY CROSSING SIGNALS



RAILWAY UTILITY COMPANY
CAR COMFORT WITH
UTILITY
HEATERS
REGULATORS
VENTILATORS

2241-2247 Indiana St.
Chicago, Ill.

Write for Catalogue

1328 Broadway
New York, N. Y.

GOLD CAR HEATING & LIGHTING CO.
220 36th St., Brooklyn, N. Y.

ELECTRIC HEATERS WITH OPEN COIL OR ENCLOSED ELEMENTS
THERMOSTAT CONTROL—VENTILATORS
WRITE FOR NEW CATALOGUE





STUCKI SIDE BEARINGS
A. STUCKI CO.
Oliver Bldg.
Pittsburgh, Pa.

H B LIFE GUARDS
PROVIDENCE FENDERS
Manufactured by
CONSOLIDATED CAR FENDER CO., PROVIDENCE, R. I.
General Sales Agents
WENDELL & MacDUFFIE CO., 110 E. 42nd St., N. Y. C.

PRETTYMAN PRESERVED P27 FOREST PRODUCTS

CREOSOTED
Railroad Cross-ties; Switch-ties; Bridge Timbers; Construction Timbers; Mine Timbers; Lumber; Piling; Poles; Posts and other Forest Products

J. F. Prettyman & Sons
Wood Preserving Plant
Charleston, S. C.



CHILLINGWORTH
One-Piece Gear Cases
Seamless—Rivetless—Light Weight
Best for Service — Durability and Economy. *Write Us.*
Chillingworth Mfg. Co.
Jersey City, N. J.

Chapman
Automatic Signals
Charles N. Wood Co., Boston



Coin Counting and Sorting Machines
FARE BOXES
Lever-Operated and Slip Change Carriers
The Cleveland Fare Box Co.
Cleveland, Ohio
Canadian Cleveland Fare Box Co., Ltd., Preston, Ont.

ALPHABETICAL INDEX TO ADVERTISEMENTS

Page

A

American Brake Shoe & Foundry Co., The 16
American Brass Co., The 43
American Car Co 46-47
American Electrical Works 43
American Steel & Wire Co 43
American Steel Foundries 4
American Telephone & Telegrapth Co. 24
Anaconda Copper Mining Co 43

B

Babcock & Wilcox Co 37
Bates Expanded Steel Truss Co. 44
Beeler Organization 36
Bell Lumber Co 43
Bemis Car Truck Co 37
Bethlehem Steel Co 17
Binghamton Railway Co 39
Blackhawk Mfg. Co 22
Brill Co., The J. G 46-47
Buchanan & Layng Corp 36
Byllesby Eng. & Management Corp. 37

C

Carnegie Steel Co 38
Chillingworth Mfg. Co 44
Cincinnati Car Co 15
Cleveland Fare Box Co 44
Cleveland Pneumatic Tool Co., The 33
Collier, Inc., Barron G 32
Columbia Machine Works, The .. 38
Consolidated Car Fender Co 44
Consolidated Car Heating Co 44

D

Day & Zimmermann, Inc 36
Differential Steel Car Co., The .. 44
Du Pont de Nemours & Co., Inc., E. I. 23

E

Edwards Co., O. M 19
Electric Equipment Co 39
Electric Ry. Equipment Co 41
Electric Service Supplies Co 7

F

Faile & Co., E. H 36
Ford, Bacon & Davis 36
"For Sale" Ads 39

G

General Electric Co 26
Globe Ticket Co 18
Gold Car Heating & Lighting Co. 44
Goodyear Tire & Rubber Co., The. 28

H

Hale-Kilburn Co 37
Haskelite Mfg. Corp 43
"Help Wanted" Ads 39
Hemphill & Wells 36
Heywood-Wakefield Co 31
Holst Englehardt W 36
Hubbard & Co 37

I

Illinois Motive Equipment Co .. 37
Illinois Steel Co 8
International Register Co 44
International Steel Tie Co., The, Insert 11-12
Irvington Varnish & Insulator Co. 41

J

Jackson, Walter 36
Jeandron, W. J 38
Johnson Fare Box Co 38

K

Kelker, DeLeuw & Co 36
Kuhlman Car Co 46-47

L

Lang Body Co ..... Insert 29-30
LeCarbone Co 38
Linn & Marshall, Inc 36
Long Mfg. Co 25
Lorain Steel Co 41

M

McClellan & Junkerfeld 36
McGraw-Hill Publishing Co ... 26-27
McGraw-Hill Book Co 35
Massachusetts Mohair Plush Co. 14

N

Nachod and U. S. Signal Co 44
National Brake Co., Inc 21
National Pneumatic Co 13
National Ry. Appliance Co 41
Naugle Pole & Tie Co 43
Nichols Lintern Co 43
Nuttall Co., R. D 2

O

Ohio Brass Co 5
Okonite-Callender Cable Company, Inc., The 43
Okonite Co., The 43

P

Perey Mfg. Co., Inc 43
Positions Wanted and Vacant ... 39
Prettyman & Sons, J. F 44
Pyrene Mfg. Co 35

R

Railway Track-work Co 37
Railway Utility Co 44
Ramapo Ajax Corp 44
Richey, Albert 36
Roebling's Sons Co., John A 43

S

St. Louis Car Co 9
Safety Car Devices Co 6
Salzberg Co., Inc., H. E 39
Samson Cordage Works 43
Sanderson & Porter 36
Searchlight Section 39
Silver Lake Co 43
Smith Heater Co., Peter 37
Standard Steel Works Co 41
Star Brass Works 41
Stevens & Wood, Inc 36
Steubenville, East Liverpool & Beaver Valley Traction Co ... 39
Stone & Webster 36
Stucki Co., A 44

T

Timken-Detroit Axle Co., The, Back Cover
Timken Roller Bearing Co., Front Cover

U

Una Welding & Bonding Co 37
Universal Lubricating Co 37

W

"Want" Ads 39
Wason Mfg. Co 46-47
Westinghouse Traction Brake Co. 10
Wharton, Jr. & Co., Inc., Wm .. 41
"What and Where to Buy," 40-42-45
White Eng. Corp., The J. G 36
Wish Service, The P. Edw 37
Wood Co., Chas. N 44

WHAT AND WHERE TO BUY—Continued from page 42

Testing Instruments (See Instruments, Measuring, Testing, etc.)

Thermostats
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter

Ticket Choppers and Destroyers
Elec. Service Supplies Co

Tickets and Transfers
Globe Ticket Co.

Tie Plates
Illinois Steel Co.

Ties and Tie Rods, Steel
Carnegie Steel Co.
International Steel Tie Co

Ties, Wood Cross (See Poles Ties, Posts, etc.)

Tires
Goodyear Tire Co.

Tokens
Johnson Fare Box Co.

Tongue Switches
Wm. Wharton, Jr. & Co.

Tools, Track & Miscellaneous
American Steel & Wire Co
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
Hubbard & Co.
Railway Trackwork Co.
Ramapo-Ajax Corp.

Towers and Transmission Structure
American Bridge Co.
Bates Expanded Steel Truss Co.
Westinghouse E. & M. Co.

Track Grinder
Railway Trackwork Co.
Ramapo-Ajax Corp.

Track, Special Work
Columbia Machine Works & M. I. Co.
Ramapo Ajax Corp.

Trackless Trolley Cars
Brill Co., The J. G.
St. Louis Car Co.

Transformers
General Electric Co.
Westinghouse E. & M. Co.

Treads, Safety Stair, Car Step
Cincinnati Car Co.

Tree Wire
Okonite Co.
Okonite-Callender Cable Co

Trolley Bases
R. D. Nuttall Co.
Ohio Brass Co.

Trolley Bases, Retrieving
R. D. Nuttall Co.
Ohio Brass Co.

Trolley Bases
Brill Co., The J. G.
Westinghouse E. & M. Co.

Trolley Material, Overhead
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Trolley Wheel Bushings
Star Brass Works

Trolley Wheels (See Wheels, Trolley)

Trolley Wire
Amer. Electrical Works
American Brass Co.
American Steel & Wire Co
Anaconda Copper Min. Co.
Roebling's Sons Co., J. A.

Trucks, Car
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Cummings Car & Coach Co.
St. Louis Car Co.

Trucks, Motor
White Company

Truss Planks
Haskelite Mfg. Corp.

Tubing, Yellow and Black Flexible Varnish
Irvington Varnish & Ins.

Turbines, Steam
General Electric Co.
Westinghouse E. & M. Co.

Turntables
Elec. Service Supplies Co.

Turnstiles
Elec. Service Supplies Co.
Perey Mfg. Co., Inc.

Valves
Ohio Brass Co.
Westinghouse Tr. Br. Co

Varnished Papers and Silks
Irvington Varnish & Ins. Co.

Ventilators, Car
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Heating Co.
Nichols-Lintern Co.
Nat'l. Ry. Appliance Co.
Railway Utility Co.
St. Louis Car Co.

Vestibule Linings
Haskelite Mfg. Corp.

Welded Rail Joints
Railway Trackwork Co.
Una Welding & Bonding Co.

Welders, Portable Electric
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co
Westinghouse E. & M. Co

Welders, Rail Joint
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.

Welding Processes and Apparatus
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co
Westinghouse E. & M. Co.

Welding, Steel
Railway Trackwork Co.
Una Welding & Booding Co

Welding Wire
American Steel & Wire Co.
Railway Trackwork Co.
Roebling's Sons Co., J. A.

Welding Wire and Rods
Railway Trackwork Co.

Wheel Guards (See Fenders and Wheel Guards)

Wheel Presses (See Machine Tools)

Wheels, Car, Steel & Steel Tire
American Steel Foundries
Bemis Car Truck Co.
Carnegie Steel Co.
Illinois Steel Co.
Standard Steel Works

Wheels, Trolley
Columbia Machine Works & M. I. Co.
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
R. D. Nuttall Co.
Star Brass Works

Wheels, Wrought Steel
Carnegie Steel Co.
Illinois Steel Co.

Whistles, Air
Ohio Brass Co.
Westinghouse E. & M. Co.
Westinghouse Traction Brake Co.

Window Guards & Fittings
Cincinnati Car Co.

Wire Rope
American Steel & Wire Co
Roebling's Sons Co., J. A

Wires and Cables
American Brass Co.
American Electrical Works
American Steel & Wire Co
Anaconda Copper Min. Co
General Electric Co.
Okonite Co.
Okonite-Callender Cable Co Inc.
Roebling's Sons Co., J. A
Westinghouse E. & M. Co.



For faster schedules and better service

THE BRILL 1928 MODEL ELECTRIC CAR is more than a "de luxed" vehicle. While in its various appointments consideration has been given to improved appearance and increased comfort as a means of attracting riders, efforts have also been made successfully to improve its operation and increase its safety.

Quicker acceleration and braking enable it to surpass other traffic, a feature which appeals to the riding public.

BRILL

THE BRILL 1928 MODEL ELECTRIC CAR is equipped to speed up operation. Two 35-h.p. high-speed motors are spring supported on the frames of each truck and are connected to the axles through universal joints and the W-N double-reduction gear units operating in oil. Its brakes are of the external contracting clasp shoe type functioning on drums, one mounted on each axle. In tests conducted in Cleveland on a heavy traffic line its performance in power consumption, acceleration and braking showed remarkable results. Considering the traffic, the 2.4 kw.-hr. per c.m. power consumption was noteworthy, and its maximum rate of acceleration was probably three times that now employed on most systems.

From the emergency position the braking tests approximated 4.5 m.p.h.p.s., which indicates its possibilities in this direction. Consequently, with its high acceleration and braking rates schedule speeds can be improved, and its quiet operation, attractive appearance, comfort, safety and good riding qualities should also appeal to the traveling public and increase riding.

Brill 1928 Model Electric Car

Learn more about it—



Designed and equipped to please the public

The J. G. Brill Company
Philadelphia

American Car Company
St. Louis

The G. C. Kuhlman Car Co.
Cleveland, O.

Wason Mfg. Company
Springfield, Mass.

Mail to
any
Brill Plant

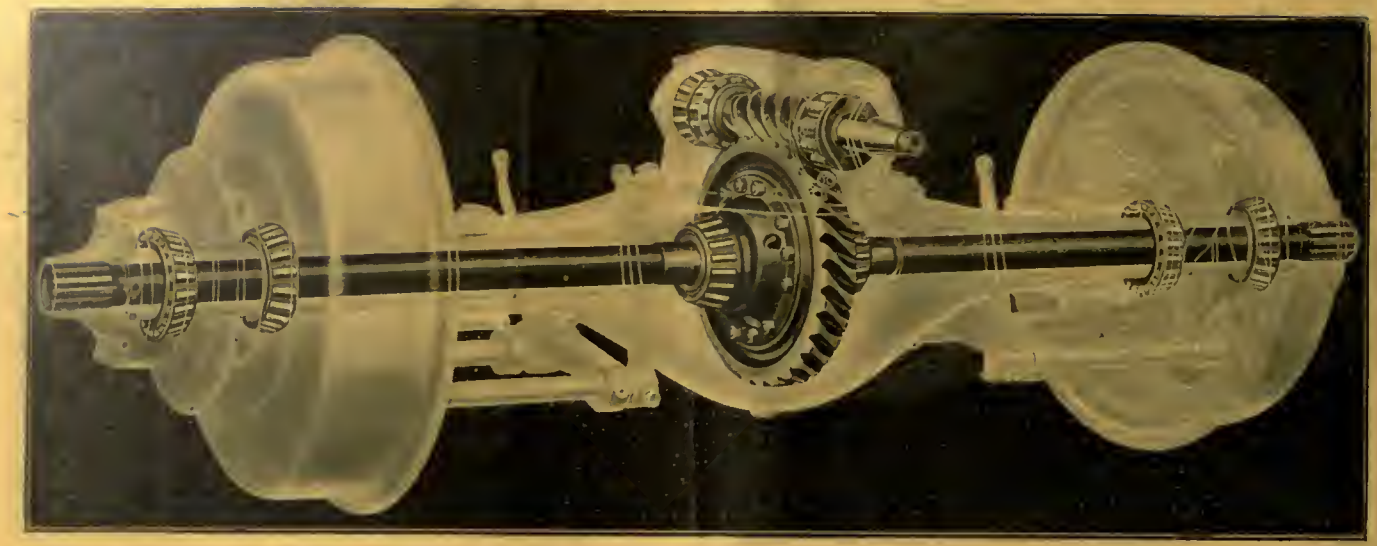
Send complete details, including performance data, on the Brill 1928 Model Car to

.....
(Name)

.....
(Title)

.....
(Railway Company)

.....
(City) (State)



After it goes into service

OPERATORS of Timken-equipped vehicles often comment on Timken's continued interest in its product *after it goes into service.*

That's natural. We believe in the worm as the ideal final drive. We're proud of Timken workmanship. And Timken Axles certainly "deliver."

THE TIMKEN-DETROIT AXLE CO., DETROIT, MICH.

TIMKEN AXLES

MAINTENANCE AND CONSTRUCTION ISSUE

ELECTRIC RAILWAY JOURNAL

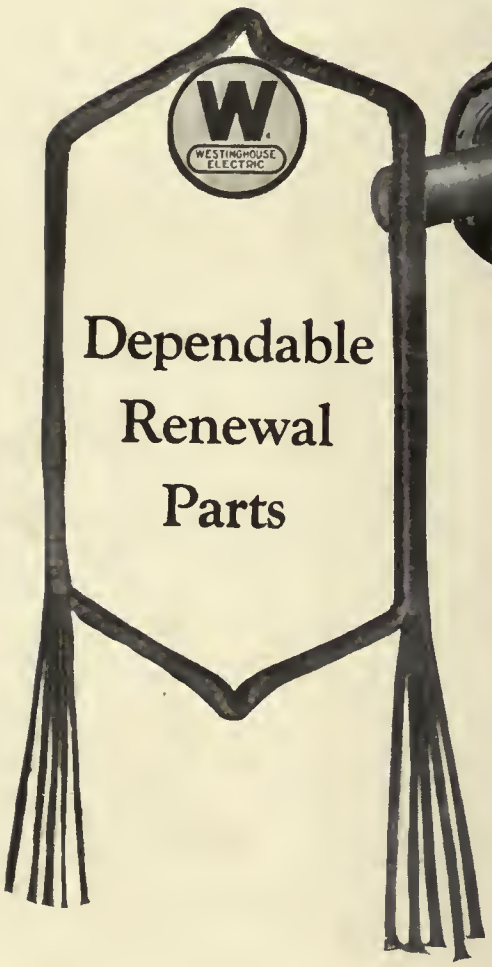
aw-Hill Publishing Company, Inc. DECEMBER 17, 1927 Twenty Cents per Copy



What ?

Should you expect from an armature coil





1. It should be so made that the winding of an armature can be done with the minimum amount of labor.
2. The construction should be such that the insulation used will withstand the maximum operating temperatures.
3. Wire or strap used should be of the highest grade in order that lead breakage may be reduced to a minimum.
4. All bends in coils should be reinforced with special insulation to prevent short circuits.

In Westinghouse armature coils, all of these features, as well as many others, are embodied.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in All Principal Cities of the United States and Foreign Countries

MEMBER AERA 1927

Westinghouse

X96440

MORRIS BUCK
Managing Editor

JOHN A. MILLER, JR.
Associate Editor

CLARENCE W. SQUIER
Associate Editor

CARL W. STOCKS
Associate Editor

ELECTRIC RAILWAY JOURNAL

CHARLES GORDON, *Editor*

HENRY W. BLAKE
Senior Editor

GEORGE J. MACMURRAY
News Editor

G. W. JAMES, JR.
Assistant Editor

PAUL WOOTON
Washington Correspondent

ALEX McCALLUM
Editorial Representative
London, England

Vol. 70
No. 21

CONTENTS

Pages
1089-1136

DECEMBER 17, 1927

Editorials 1089

Special Devices Improve Maintenance in Chicago Shops 1092

Equipment for opening, baking and heating insulating compound is important. Housing fits built up by welding and motors rebored. Improved devices for finishing shafts and axles, compressor overhauling, carpenter shop work, painting and cleaning.

Attractive Depot Completed at Santa Rosa 1097

Asphaltic Concrete Used in Oregon City Track Reconstruction 1098

Catenary with Unusual Pole Spacing Withstands Cyclone 1100

By L. W. BIRCH.

Overhead line subjected to wind velocity of 100 miles per hour. On a section with poles spaced 225 ft. after eliminating a few leaning poles, damage was reduced to a small maintenance item.

Trolley Car Operated by Radio 1102

The brief for the Coffin award submitted by the Arkansas Power & Light Company gives details of the demonstration that was conducted in that city.

Light Weight Features Joliet Car 1103

By J. R. BLACKHALL.

Wide use of aluminum in car body brings weight per seat to 475 lb. High acceleration and braking rates combined with slightly increased free running speed have reduced schedule time.

New Jersey Stockholders on the Increase 1106

Adventures of Old Man Trouble 1107

Harold E. Bean Wins the November Monthly Maintenance Prize 1108

Maintenance Data Sheets 1109

New Equipment Available 1115

Association Activities 1116

New England Club Has Record Meeting 1116

68 Years of Railway Service in Connecticut 1117

By CHARLES RUFUS HARTE.

Co-ordinating All Transportation Facilities Under One Management 1119

By J. M. SHAW.

Unselfish Co-operation Needed to Solve Traffic Problem 1120

By R. C. HALDEMAN.

American Association News 1121

News of the Industry 1123

Recent Bus Developments 1128

Financial and Corporate 1130

Personal Mention 1133

Manufactures and the Markets 1134

Budgets

GROWING importance attaches to the preparation of the annual estimate of income and expenditures for every business. It is only when the prospects for the coming year receive careful consideration that plans can be made which adequately reflect the work to be done. This is necessary for an industry no less than for a single company.

Among the regular features of the Annual Statistical Number of ELECTRIC RAILWAY JOURNAL none has proved of greater value than the estimate of expenditures for materials for construction and maintenance of electric railways. This has been obtained each year from a survey of the actual budgets of a large number of properties, and accurately forecasts the activities of the industry as a whole.

On this survey will be based, in turn, the budgets of manufacturers that serve the industry. Every one who has the progress of the electric railway industry at heart will await this and the other features of the Annual Statistical Number with interest.

McGRAW-HILL PUBLISHING COMPANY, INC.
Tenth Avenue at 36th Street, New York, N. Y.
New York District Office, 285 Madison Ave.

JAMES H. McGRAW, President
JAMES H. McGRAW, JR., V.-P. and Treas.
MALCOLM MUIR, Vice-President
EDWARD J. MEHREN, Vice-President
MASON BRITTON, Vice-President
EDGAR KOBAK, Vice-President
C. H. THOMPSON, Secretary

WASHINGTON: National Press Building
CHICAGO: 7 S. Dearborn Street
PHILADELPHIA: 1600 Arch St.
CLEVELAND: Guardian Building
ST. LOUIS: Bell Telephone Building
SAN FRANCISCO: 883 Mission Street
LONDON: 6 Bouverie Street, London, E. C. 4

Member Associated Business Papers, Inc.
Member Audit Bureau of Circulations

Cable Address: "Machinist, N. Y."

Publishers of

Engineering News-Record
American Machinist
Power
Chemical and Metallurgical Engineering
Coal Age
Engineering and Mining Journal
Ingeniería Internacional
Bus Transportation
Electric Railway Journal
Electrical World
Industrial Engineering
Electrical Merchandising
Radio Retailing
Construction Methods

Electrical West
(Published in San Francisco)

American Machinist—European Edition
(Published in London)

The annual subscription rate is $4 in the United States, Canada, Mexico, Alaska, Hawaii, Philippines, Porto Rico, Canal Zone, Honduras, Cuba, Nicaragua, Peru, Colombia, Bolivia, Dominican Republic, Panama, El Salvador, Argentina, Brazil, Spain, Uruguay, Costa Rica, Ecuador, Guatemala, Chile and Paraguay. Extra foreign postage to other countries $3 (total $7 or 20 shillings). Subscriptions may be sent to the New York office or to the London office. Single copies, postage prepaid to any part of the world, 20 cents.

Change of Address—When change of address is ordered the new and the old address must be given, notice to be received at least ten days before the change takes place.

Copyright, 1927, by McGraw-Hill Publishing Company, Inc.

Published weekly. Entered as second-class matter, June 22, 1908, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Printed in U. S. A.

Number of Copies Printed, 6,220

BETTER RAIL, BETTER TRANSPORTATION

Words of Wisdom

Here is a gold nugget expressed by Mr. E. J. Dickson, Vice President United Elec. Rys., Providence:—

"The industry is serving a new public. Just as the youth of today are fearlessly setting new standards of living that make the older generation often stand aghast, just so have the demands changed in transportation. If the people of today are to be sold, common carrier service must be produced on today's specifications."

—and today's specifications for desirable transportation include comfort, speed, quiet and safety. If anybody has found how to give such service on rough track, he hasn't published the formula. But any number of roads realize that cars, whether old or new, ride better and last longer if the rail grinders and electric arc welders are kept busy the year 'round.

Bulletins?

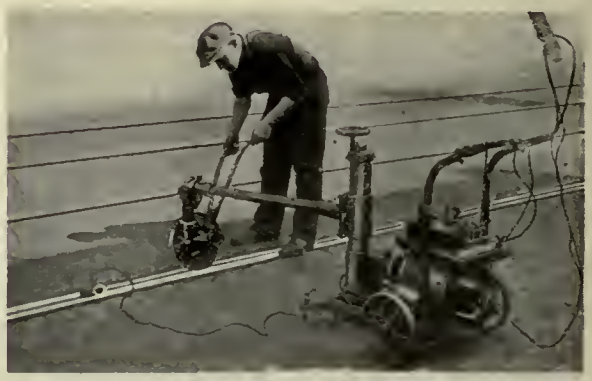
Railway Track-work Co.

3132-48 East Thompson Street, Philadelphia

AGENTS:

Chester F. Gailor, 30 Church St., New York
Chas. N. Wood Co., Boston
Electrical Engineering & Mfg. Co., Pittsburgh
H. F. McDermott, 208 S. LaSalle St., Chicago
P. W. Wood Railway Supply Co., New Orleans, La.
Equipment & Engineering Co., London
Frazar & Co., Japan

2253



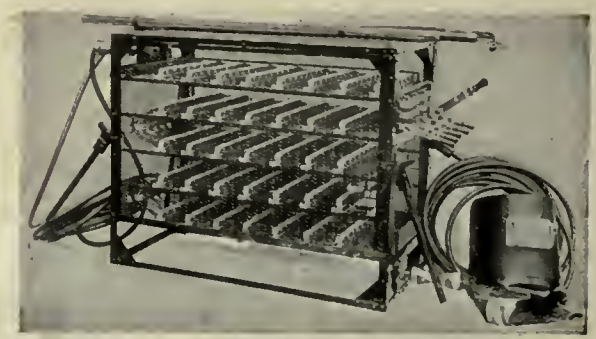
Eureka Radial Rail Grinder



Vulcan Rail Grinder



Reciprocating Track Grinder



"Ajax" Electric Arc Welder

BETTER RAIL, BETTER TRANSPORTATION



Join the 1928 Savings Club



NEXT YEAR can be made the best in history for many electric railways—from the standpoint of both gross income and net revenue. It can be done on your property by carrying out *now* those detail service and equipment improvements which experience shows attract more riders. For, today, increased revenues depend primarily on *continuous* service betterment.

But, in striving for increased revenues, remember, too, the importance of those many possible small economies, easily made, which, totalized, contribute substantially to the net. Save only 1% from the 69.3% now devoted to operating expenses and you increase the net nearly 20%!

Service records on scores of properties show, for example, that substantial annual savings result from the use of O-B Line Materials, Bonds, and Car Equipment devices. One property is saving over $5,000 a year on trolley ears alone, since using Marathon Ears. This is but typical of the economies effected with the many other O-B electric railway products.

With only a small down payment, invested in better line materials and car equipment devices, you can join the 1928 O-B Savings Club now—and be sure of a greater net income next year! Address

Ohio Brass Company, Mansfield, Ohio
Dominion Insulator & Mfg. Co., Limited
Niagara Falls, Canada
7748

Ohio Brass Co.

SALES OFFICES: NEW YORK CHICAGO PHILADELPHIA PITTSBURGH CLEVELAND SAN FRANCISCO LOS ANGELES

PORCELAIN INSULATORS
LINE MATERIALS
RAIL BONDS
CAR EQUIPMENT
MINING MATERIALS
VALVES

Lighter Wheels Make Lighter Cars



Several hundred pounds can usually be cut from the weight of the car by using Davis "One-Wear" Steel Wheels. Because Davis "One-Wear" Wheels are of special heat-treated steel, they can be made lighter while retaining full strength.

Davis "One-Wear" Steel Wheels should be in the running gear of every really modern car.

AMERICAN STEEL FOUNDRIES

NEW YORK CHICAGO ST. LOUIS

Put them in the ring together!



Steel Twin Ties in Salt Lake City

TAKE a Steel Twin Tie—and a wood tie. Put them in the ring together and let them fight it out.

Let them both take the constant stress of heavy duty city traffic, let them fight water that might seep down—ice that may form—let them fight the tendency for rails to spread or cold roll—and let them fight old age—old age that is premature because of 24 hour service through the speeding years.

The Steel Twin Tie comes out just as it went in—it doesn't need to come out at all! But the wood tie—it's all set to be an antique museum piece entitled—"This *was* a tie!"

Write today for delivered prices of Steel Twin Ties for your 1928 program.

THE INTERNATIONAL STEEL TIE CO.
CLEVELAND, OHIO

STEEL TWIN TIE TRACK
THE BASE OF MODERNIZATION





MODERN CARS Of All Types

for City and Interurban Service

CARS recently built by this company for several properties have brought forth much favorable comment from the public in the various localities. The riding comfort has been especially noted. This is a feature of the modern car that goes far to increase good will and build patronage. Cummings No. 62 Truck, shown on the above car, has contributed largely to the riding comfort of our cars.

CUMMINGS CAR AND COACH CO.

Successors to McGuire-Cummings Mfg. Co.

111 W. Monroe St., Chicago, Ill.



In the "Good Old Days"

and To-day:

Maybe some thought it was the "good old days" at times—but no one ever did at the moment he was carried past his corner. A circus barker's voice and a thorough knowledge of football tactics were the surest guarantee that one would get off at the designated corner.

But there's no trick in it today when cars are equipped with Faraday Passenger Signal Systems. Even the most timid soul can reach up and press the button. And know that the motorman will stop because the signal system is ever reliable.

Such a convenience is always appreciated by the public at all times—and is a practical necessity during rush hours.

Other ride-selling features are described in Catalog No. 7—which contains the complete line of Keystone Car Equipment.



No. 19403 Buzzer

Type FB

Type CB

Faraday Passenger Signal Systems

A complete line of high and low voltage bells, buzzers, resistances and pushes constitute this passenger signal system for railway cars and buses. These different devices are substantially constructed and should not be confused with similar material of lesser quality. They are installed so that passengers can signal motorman to stop at intersections and also for various other signaling requirements.

Home office and plant at 17th & Cambria Sts., PHILADELPHIA; District offices at 230 So. Clark St., CHICAGO; 50 Church St., NEW YORK; Bessemer Bldg., Pittsburgh; 88 Broad St., Boston; General Motors Bldg., Detroit; 316 N. Washington Ave., Scranton; Canadian Agents, Lyman Tube & Supply Company, Ltd., Montreal, Toronto, Vancouver.

ELECTRIC SERVICE SUPPLIES CO.

MANUFACTURER OF RAILWAY, POWER AND INDUSTRIAL ELECTRICAL MATERIAL



The Westinghouse Tight-Lock Coupler

..... *a modern coupler for modern service*

With the adoption of train formation, rather than single car operation, to facilitate modern, quick, economic service, many traction properties have solved their coupling problems by the adoption of the Westinghouse Tight Lock Coupler.

In one operation, this modern coupler effects mechanical, electrical, and air connections . . . it is no longer necessary for crews to go between cars to make a coupling. Another feature of the Westinghouse Tight Lock Coupler is its ability to automatically take up slack caused by natural wear on the latches, thereby preventing relative motion between adjoining couplers. These advantages all contribute to the success of this modern coupler . . . Its adoption assures the ease, safety, and economy of single car control in multiple unit operation.



Westinghouse K-1-A Tight Lock Coupler

Tight Lock Couplers are promoting safety and economy in multiple unit traction service on many properties . . . they are furnished in three distinct types . . . the "H" for heavy, high speed trains; the "K-1-A" for medium and light weight cars; and the "C-3-A" for light cars, where the electric feature is not desired.

WESTINGHOUSE TRACTION BRAKE CO.
General Office and Works, WILMERDING, PA.

2220

WESTINGHOUSE TRACTION BRAKES

via a.c.f.



New York to Boston



A.C.F. and N. Y. N. H. & H.

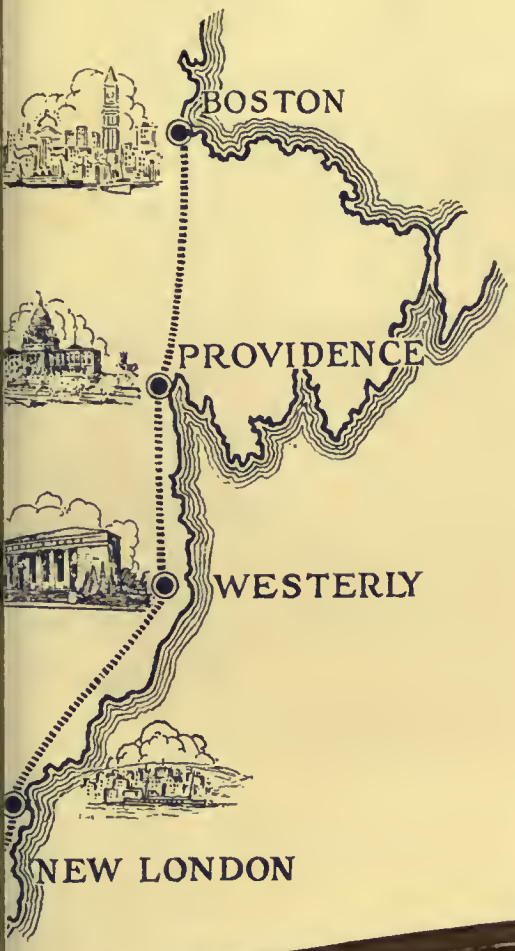
Great rail carriers have invested millions of dollars in A.C.F. coaches—expressing not merely faith, but positive conviction, that the universal mass transportation experience of A.C.F. means high-revenue equipment for roads, as for rails. The New York, New Haven and Hartford is one of the prominent rail interests operating A.C.F. coaches. New Haven service is extended to principal New England centers by means of the motor coach routes of the New England Transportation Co., a New Haven subsidiary.

From Boston, via Providence, Westerly, New London, New Haven, and Bridgeport, A.C.F. Parlor Observation coaches carry passengers to New York. From Hartford to Springfield, from Hartford to New London, and on other routes, A.C.F. coaches are used. Through densely populated New England, passengers are carried on fast



A.C.F. Hall-Scott





schedules, in sumptuous comfort. The full visibility from every seat, made possible by the patented A.C.F. Observation design, exerts its powerful rider appeal in this historically interesting territory.

The "mezzanine" observation section of these coaches is so attractive that it fills first—some operators even obtain extra fare for these seats. Up there the rear wheels are quiet, the wheel houses do not interfere, the ventilation is perfect, and the view is unobstructed. Down under the "observation" section is the spacious, fully protected baggage compartment, which loads at curb level!

Never have the requirements of the Transportation and Operating Departments been as auspiciously combined. This is reflected in more passenger-miles per coach mile—the utmost revenue possibilities as well as the low operating cost characteristic of A.C.F. equipment.

AMERICAN CAR AND FOUNDRY MOTORS COMPANY

30 CHURCH STREET, NEW YORK





Challenging the Private Motor Car with A.C.F. De Luxe Urban Service



Shoppers and the business classes provide almost constant peak loads, in both directions, for the A.C.F. De Luxe Urban Coach operation between Providence and Bristol, in Rhode Island. That has been the New England Transportation Company's experience with the type of service made possible by its fleet of A. C. F. semi-de luxe urban coaches—the first direct challenge to private motor cars.

One-hour running time is maintained, with half-hour headway, over this eighteen-mile route through four towns. There are 28 round trips daily—27 on Sunday. The coaches are spacious and easy-riding, very attractively fitted, and conspicuously capable in traffic. This fast, luxurious, *relaxing* urban transportation—free of irksomeness—shows its ability to draw regular patronage from a class of riders appealed to by no other type of urban coach.

Operators find it possible to obtain higher than average fare on A.C.F. de luxe urban routes. Because standees can be properly accommodated in rush hours, a higher than average load factor can be maintained for de luxe service.

Profitable developments like the A.C.F. De Luxe Urban type are the reason experienced operators consistently look to A. C. F. for high-revenue equipment.

AMERICAN CAR AND FOUNDRY MOTORS COMPANY
30 CHURCH STREET, NEW YORK

A.C.F. builds the most comprehensive line of motor coaches ever offered by a single manufacturer. Capacities from 16 to 60 passenger. All body types and styles. Quality considered, prices are low.





Safety
In Holiday Traffic

The traffic problem during the holiday season this year will be of tremendous volume. Street Cars will be called upon to handle this heavy traffic with the greatest speed, safety and comfort. NP Door and Step Control has helped establish and maintain the safety record of street cars—*the safest passenger carrier known.*

NP

NATIONAL PNEUMATIC COMPANY
Executive Offices: Graybar Building, New York
General Works, Rahway, New Jersey

Chicago
518 McCormick Building

Manufactured in
Toronto, Canada by
Railway & Power Engineering Corp., Ltd.

Philadelphia
1010 Colonial Trust Building

Saving Seconds may mean lives



Near-accident reports, from properties using the Cincinnati Duplex Air and Magnetic Brake, show a high percentage of cases in which increased deceleration gave the few extra seconds needed for the vehicle or pedestrian to get clear of the track.

Actually the Magnetic Brake increases the rate of retardation (deceleration) of the average double truck car by 40 to 60 per cent and thus effects a saving of from 2 to 6 seconds in stopping time.

Such greatly improved braking efficiency has enabled at least two properties to make a substantial reduction in their accident reserve, while improving service with fast schedules.

May we send you further evidence and complete technical data? Quotations from operating reports on a famous Kentucky property are given on the opposite page.

where seconds

• • • •

From the written reports of inspectors on a famous Kentucky property, "Magnetic equipped"

"Auto cut out of safety zone into track. Ran within 6 inches of car but motorman applied his magnetic and saved accident."

* * *

"Auto ran around in front of car but magnetic saved accident."

* * *

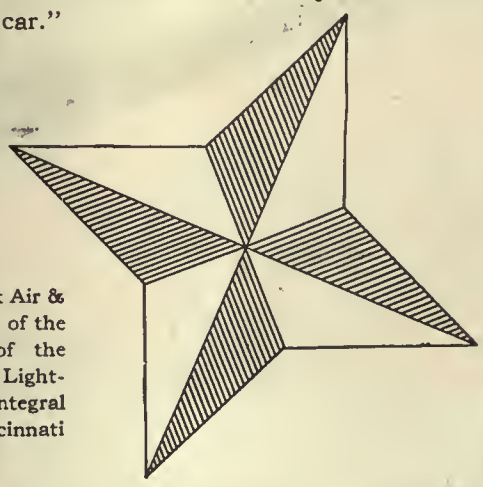
"Auto came out from behind another auto within 20 feet of car. Magnetic was all that saved accident."

* * *

"A woman walked in front of car at Lafayette Hotel. Motorman used his magnetic brake and stopped within 6 inches of the woman."

* * *

"Saved an accident at.....and.....by use of magnetic. Auto cut into car."

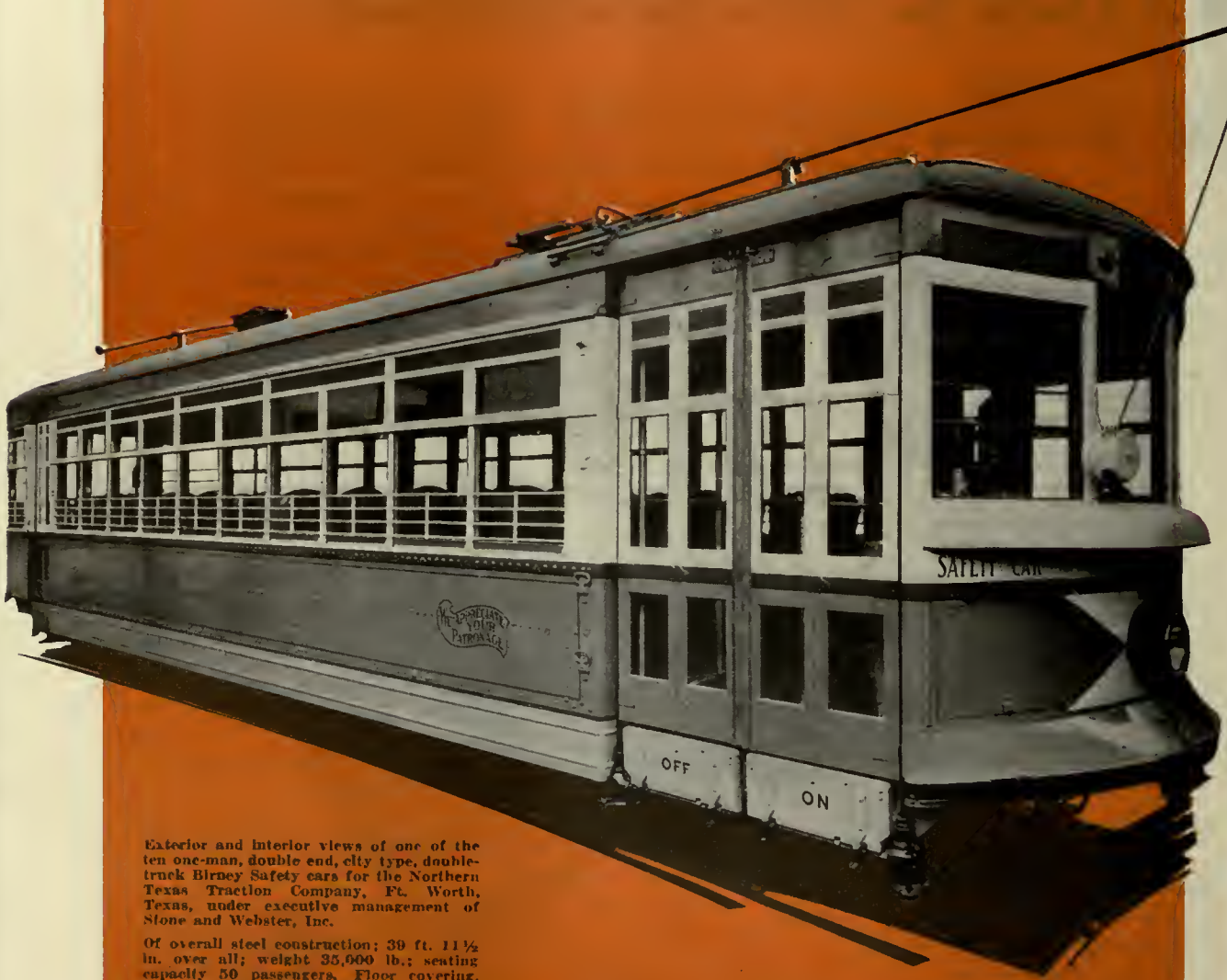


The Cincinnati Duplex Air & Magnetic Brake is one of the important features of the Cincinnati Balanced Lightweight Car and is an integral part of the new Cincinnati High Speed Truck.

CINCINNATI BALANCED LIGHTWEIGHT CARS

still a step ahead of the modern trend!

Fort Worth, a Stone and Webster property, knows the



Exterior and interior views of one of the ten one-man, double end, city type, double-truck Birney Safety cars for the Northern Texas Traction Company, Ft. Worth, Texas, under executive management of Stone and Webster, Inc.

Of overall steel construction; 39 ft. 11½ in. over all; weight 35,000 lb.; seating capacity 50 passengers. Floor covering, green cork linoleum; mahogany finish interior trim; leather upholstery. Utmost passenger appeal and comfort in every detail.





value of ride-selling cars!

IF you saw this BIRNEY car at Cleveland, you know its sales appeal.

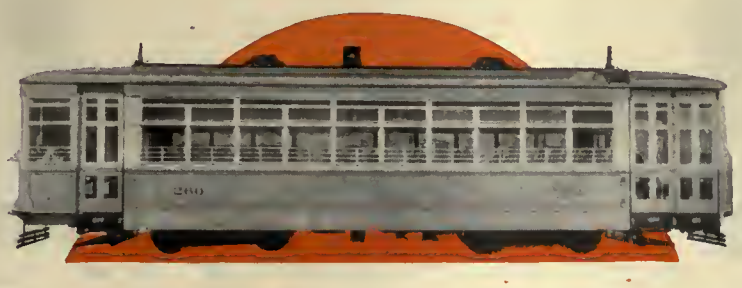
And when ten of these new cars roll smoothly and quietly on the streets of Ft. Worth, Texas, the Northern Texas Traction Company will find a grateful public ready to ride.

Modern transportation units like this lift the street car to a higher plane of service. And because such service fulfills the operator's obligation to the public, the street car becomes the rider's choice — even in the face of strenuous competition.

Properties which have applied these principles of modern merchandising to electric railway transportation are reaping revenue increases.

Fort Worth is one of them.

Why not make it possible to sell rides on your property?



St. Louis Car Co.

Quality Cars

PHONO-ELECTRIC OVERHEAD IS A MEASURABLE ECONOMY



Only the highest grade raw materials are used. Virgin copper ingots, testing over 99.9% pure, are the basis of Phono wire.

No one has ever set higher quality standards for wire!



Every pour of Phono metal is double sampled and analyzed. A runner carries a poured sample to the laboratory to check the contents of the furnace.



Each furnace charge is accurately weighed out. A small amount of Banca tin is packaged for the Phono charge.

Every so often you hear whispers of strange doings from behind the barred doors of research laboratories. Our own research has little mystery connected with it. One of its duties is making certain that Phono-Electric, and its allied wires, are maintained at the high standards of quality and uniformity which its reputation demands.



Later the gate end of the billet is sawed off and visually inspected for subsurface defects.



Under accurate control, a large charge is melted in an electric arc furnace.

Frankly we believe it would be impossible to take greater care in the manufacture of a product.



"Conductivity Bridge" for determining electrical characteristics of Phono wires that have been accurately drawn to finished sizes.

BRIDGEPORT BRASS

PHONO-ELECTRIC PHONO HI-CON PHONO HI-STRENGTH

A COMPLETE WIRE SERVICE FOR ELECTRIC RAILWAYS

Bridgeport Brass Co., Bridgeport, Conn. - New York - Philadelphia - Chicago - Detroit - Cleveland



—1928—
another year
another budget!

Thermit

Budget time is coming and it's time to "Think of Thermit"

Consider the rail joint problem—and the modern demand for smooth-riding track, quiet-riding track, long-wearing track.

Can you afford to temporize longer with anything less than a permanent weld? Can you be satisfied with less than a joint eliminating process in which "the first cost is the last cost?"

Thermit affords a permanent weld. It makes a continuous smooth-riding rail which causes no more costs for maintenance, after the original installation is made.

Get the Thermit estimates ready now —and put them in your 1928 budget. Show your Board of Directors the facts—and they'll O.K. the Thermit program.





METAL & THERMIT CORPORATION
120 BROADWAY, NEW YORK, N.Y.

PITTSBURGH CHICAGO BOSTON SOUTH SAN FRANCISCO TORONTO

Of all the phases of modernization, increased schedule speed has the most far-reaching effect on earnings. It boosts your "production" per man-hour, and thereby reduces operating cost per car-mile. Most important of all, *it sells more service.*



Do modern cars increase schedule speed?

Here are reports from six roads. Each has improved its schedules during recent years. In each case modern cars were necessary. General Electric car equipment is used on every road.

"New equipment was necessary to maintain the increased schedule speeds in most cases."

Levis (P. Q.) Tramways Co.

"New light-weight cars, weight 32,000 pounds using GE-258 Motors, have been purchased and these accelerate much faster than the older, heavy type of car."

Morris County (N. J.) Traction Co.

"Schedule speeds increased by a gradual cut in running time; also through new equipment affording better acceleration."

New Orleans (La.) Public Service, Inc.

"Schedule speeds slightly increased. By reducing stand time; also by the use of new equipment."

Birmingham (Ala.) Electric Co.

"Our schedule speed has been increased. Made possible by better track conditions; improvements in equipment such as light-weight all-steel construction and improvements in the motor design which give the car a faster acceleration and running speed; giving more attention to schedule maintenance and construction; a more thorough study of traffic conditions."

San Antonio (Tex.) Public Service Company

"Schedule speed increased from 8 miles to 9.2 miles an hour. This was accomplished by making a survey and finding every possible place where the speed could be increased, and also by using new equipment in the form of safety cars with a quick pick up and by eliminating all unnecessary lagging."

Wisconsin Power & Light Co.

The resources and the service of the entire G-E organization are available to consider the problems of modernization and co-ordination—to find the most effective means of transportation and to build appropriate equipment.

330-19

GENERAL ELECTRIC

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review
Published by McGraw-Hill Publishing Company, Inc.
CHARLES GORDON, *Editor*

Volume 70 New York, Saturday, December 17, 1927 *Number 25*

What Is a Modern Car?

REQUIREMENTS of the modern car have been discussed at length so often that it would seem there is nothing more to be said. Still, despite all the publicity that has been given to the subject doubt seems to exist in the minds of some railway men as to just what constitutes a modern car. For instance, the manager of a property recently approached his banker with a request for funds with which to purchase some modern cars for his road. The banker asked him to find out if he could obtain cars in the second-hand market that would be "just as good" as the new cars he wanted. Naturally this was discouraging, but the manager set out to prove that by no stretch of the imagination could cars cast off elsewhere be the equal of new ones for his own property.

Practically all the changes which have been incorporated in modern electric railway equipment have been included with the idea of making the cars earn greater profits, for after all the purpose of a railway is to earn a return on its investment, whether it is a private company organized for profit or a municipality pledged to give service to the community. The innovations are generally made to increase speed, safety, comfort and appearance. Some changes are primarily to reduce operating expense, but usually they cannot be considered apart from the others.

Four Essentials for Present-Day Equipment

WHILE the several elements that make for improvement in these various lines have been the subject of articles and editorials in this paper from time to time a recapitulation gives a means for the management of any property to check up and determine if its equipment really is modern.

Speed is a relative quantity. What is desired is not necessarily a high maximum velocity, but a high average from one end of the run to the other. This involves many elements. The car must be light enough in weight that a reasonable motor equipment can handle it. The motors must be sufficiently powerful to accelerate the car quickly and to maintain a reasonably high maximum speed. The structure must be strong enough to withstand the strains incident to a hard schedule. Brakes must be reliable and must give smooth and rapid retardation. So much for the movement. The modern car must also be designed to minimize the lack of movement, or standing time. There must be facilities for rapid collection of fares to prevent waste of time. For the same reason there must be effective control of passenger movement within the car. It must be easy for the passengers to board and alight quickly to prevent delays to car movement. This involves the design of doors and door mechanisms that work surely and swiftly.

Safety likewise demands full control of a number of elements. Efficient and reliable brakes have been referred to already, as have high quality of materials and correctness of design. The steps must be of proper height and width and there must be convenient arrangements for ingress and egress. Positive signaling systems are needed if two men operate the car and in any event there must be positive control provided to insure closing and unfailing action of the doors. Automatic protection of the passengers in the event of incapacitation or carelessness of the operators is now considered an essential.

Comfort demands attention to many details. The seats and the seating arrangement must be satisfactory. There must be ample heat and light and good ventilation. There must be freedom from roughness in handling the equipment. Proper facilities must be provided for the operator, and the automatic features must be simple and easy to work with. Arrangements to prevent crowding around the doors and in the aisles are also factors in promoting both comfort and safety.

Appearance, which is considered so essential today, requires good architecture and departure from conventional design. The latest models have low headroom and clear vision for passengers and operators, particularly the view ahead. Lines must be graceful, both inside and out. Unsightly apparatus either must be redesigned or concealed. Interior appointments must be good, the floor covering attractive and the accessories must harmonize with the design. A pleasing decorative scheme, both on the interior and the exterior, is essential. The signing should give the patron a means of choosing the right car without hesitation.

These features have their primary effect on the earnings of the car. It stands to reason that the parts should be designed for maximum efficiency in operation. The equipment should be easy of maintenance and it should need but little time in the shops, where it is unproductive. Anything that reduces the standing time of the car promotes speed, and in turn reduces operating cost per unit of service rendered. Safety features likewise reduce accident expense. Features that permit the use of one man instead of two reduce platform cost. Lightness of weight reduces the cost of energy, wear on track and paving and wear of the car itself.

Few cars so far designed and built embody all these desirable characteristics. Often pet ideas of the designer or of the operator militate against the attainment of all the best points in one structure. However, as the principles of modern design are becoming better and better understood there is a distinct trend toward the inclusion of more and more of the desirable features, with the result that the latest cars are far in advance of those built a few years ago. As to the financial results, the statements of many railways bear ample witness of their success.

This is the issue in December that is devoted essentially to maintenance and construction subjects

Growing Pains

FOR the past several years the mass of workers on Chicago's transportation systems have been subjected to management policies and influences which have gradually permeated through to the lowliest platform recruit. Square dealing has been the first rule in that policy—square dealing flanked by sincerity and backed by courage and firmness. No compromise has been tolerated regarding the joint responsibility of management and labor to protect the public's interest. The principle has been firmly maintained that transportation systems are run to serve the public first and to earn a fair return to capital and labor second. The worker who would serve his own interests or gratify his own feelings at the expense of his patrons has been classed as an unfit employee for a public service company.

Management expects co-operation because it merely shares with the workers the responsibility of providing safe, dependable, efficient and courteous service. It insists upon obtaining this co-operation in full measure. In return it gives intelligent and expert direction, impartial justice, sympathetic understanding and courageous leadership. This is the creed that has gradually permeated into the ranks of Chicago transportation workers. In the day-to-day contacts between men and management, the principle of fair dealing has been put not so much into words as into action. So it was inevitable that deep-seated currents of readjustment should be set in motion.

New leaders arise to question reactionary labor thinking. Old leaders, failing to grasp the full import of new conditions, struggle to maintain their prestige and influence. Thus events which in themselves may confuse the casual observer are better understood when underlying forces and influences are perceived. For many years the mental attitude of Chicago transportation labor was far from healthy. Present symptoms indicate an acute case of growing pains.

Increased Attention to the Power Drives of Railway Shops Will Pay

IN THESE times of high costs for labor and materials, electric railway managements are interested in anything that will reduce expenses. One thing that has not received the attention that it deserves is the mechanical power drive used in shops.

If railway shops were part of an industrial plant, experienced mechanical power transmission engineers would be engaged to make certain that shafting is in accurate alignment, that pulleys are of proper size to develop highest efficiency for the individual machine tools, that belting is of a class to give longest service with low maintenance cost and freedom from interruptions, that all excessive slippage is eliminated, that modern lubrication practice is followed and that excessive friction from plain bearing transmission equipment is avoided. Since by some persons railway shops are thought of as only repair shops, little attention is given by them to the factors that enter into efficient mechanical drive. As long as a machine tool will operate at a speed somewhere near what is expected the drive is assumed to be all right.

To show how easy it is to let bad practices creep in, a recent inspection by a belting engineer in one shop showed that there was a power loss of nearly 50 per cent between the driving motor and the group of machines served. A few very simple changes brought the efficiency up to normal.

Nearly every electric railway shop has a wood mill, where there is an accumulation of dust. Dirty belts have excessive slippage and as a result there is rapid wear of the belts themselves and of the pulley faces. Belts used in such a place should have a tension higher than normal, or else there should be large arcs of contact on the small pulleys to prevent slippage. A common method of obtaining a large contact arc is by use of a gravity idler. Composition pulleys sometimes help reduce slippage. Where an accumulation of dust cannot be prevented on belts it is especially necessary to consider the quality of the belt material used, as long life and low maintenance cost can best be obtained by having a pliable, tough and strong belt. The type of fastening used for belts is also an important factor in preventing interruptions.

Enforced idleness of a machine at a time when it is urgently needed may cause a car to be held in the shop much longer than otherwise. Its earning power is thus decreased, although the fact may not be known to the management. It should be the duty of the shop foreman to show just what is needed to get production standards in the shop up to the most economical point, and specifically to point out conditions that he cannot remedy with his own forces.

In looking for additional opportunities to decrease costs during the coming year general managers will do well to have conditions of the mechanical power transmitting equipment in shops investigated and make desirable changes.

Many Important Considerations Enter Into Comfortable Seat Design

COMFORTABLE seats in cars are essential if passenger riding is to be increased. Until a few years ago electric railways gave little consideration to this most vital question. A seat which would not wear out and which reversed satisfactorily if used for double-end operation, or stood up rigidly for single-end operation, was good enough. Some of the blame for this indifference may be laid to the manufacturer, but operators did not take readily to the idea of providing comfort for the riders, particularly when it was found that improvements would increase costs.

At present there is somewhat of a tendency to go to the other extreme without thought of longevity and ease of maintenance of the seat itself. Many of the experimental seats installed may be classed as comfortable, but freedom from maintenance trouble appears to have been given insufficient consideration.

A high seat back that provides a head rest for the passenger, even though correctly designed, is not necessarily comfortable, because all too often the rider cannot take the proper position due to too close spacing of the seats themselves. A cushion can be soft and yet uncomfortable, particularly if care is not used in determining the height above the floor. Cushion heights from 19 in. to even 22 in. are used too commonly, when a 16½-in. to 18-in. height should be a maximum. To use the lower height satisfactorily, study should be made of heater side wall and design of the car in relation to the seats themselves.

If it becomes necessary to replace seats in a few years, the cause of comfortable seating will get a setback, but this is inevitable unless great care is used in securing a seat that is not only comfortable but is so ruggedly

constructed that it will stand the severe service required and do so without excessive cost of maintenance. Seats for passenger cars cannot be built like parlor furniture and be expected to stand up in service. The springs should be tempered so as to give proper deflection without taking a set and the spring units should be designed and constructed to give an absolute minimum of upholstery deformity. Many years have been spent in studying upholstery foundations for car service. The lessons learned should not be disregarded.

Comfort in seats has emphasized the necessity for use of softer covering. Canvas-lined rattan unquestionably is an excellent covering for withstanding wear. It is easy to maintain in a presentable condition. This covering, however, is being replaced to a great extent by plush and genuine leather, although recently soft and comfortable seats have been designed to utilize the excellent qualities of rattan in combination with leather or plush. For certain kinds of service this combination works out satisfactorily.

O'Fallon Case Did Not Decide Valuation Basis

NOT until the Supreme Court of the United States passes upon the matter will the so-called O'Fallon railroad valuation case be settled. In the decision just rendered, the Federal Court for the Eastern District of Missouri sustained the order for recapture of earnings issued against the O'Fallon road after modifying it in one particular. The court held the commission's determination valid with specific reservation that the methods used in arriving at a value on which the per cent of earnings is calculated should not enter into the case. The two circuit judges, Kimbrough Stone, who handed down the decision, and Arba Van Valkenburgh, agreed on this point. The district judge, Charles B. Faris, concurred in the judgment, but expressed the opinion that the commission's valuation method was justified, although defective in some particulars. The two circuit judges held it unnecessary to go into the basis of valuation or the question of confiscation, because the road earned more than 6 per cent on the full valuation claimed by it. They said that under such circumstances a claim of confiscation could hardly be made. The decision read in part:

> It seems that the contention of the United States is well founded; that the verity of the commission's valuation herein need not be examined and cannot affect the recapture order, and that therefore such order is not open to attack upon the grounds of wrongful valuation. If this be true, it is unnecessary to examine and determine the various contentions made by the parties and *amici curiae* concerning the proper manner of ascertaining value hereon.

In his comments, Judge Faris said that a valuation arrived at by the sole use of either the "prudent investment" theory, based on the cost when constructed, or on the present cost of reproduction new less depreciation, would work presently to the public and eventually to the carriers themselves such monstrous iniquity as to preclude wholly the use of either of such methods exclusively, and would eliminate the notion that Congress contemplated the exclusive use of either of such methods.

Summed up, the court held that 6 per cent upon the value affixed by the commission on the O'Fallon property, plus one-half of what it termed "excess earnings" for the several years considered, taken together, constitute a fair return upon the value of the property even as claimed by the carrier. The court thus saw no necessity for concerning itself with the commission's valuation or with the method of the commission in reaching its conclusion.

The Theory on Which the Commission Acted

THE O'Fallon case was the first decision by the Interstate Commerce Commission interpreting and applying the so-called recapture clause of the transportation act of 1920. Since no definite rule of valuation was laid down in the transportation act of 1920, the commission proceeded on its own initiative. By a vote of 6 to 4 it held in effect that the value of the property for rate-making purposes, as determined by the commission for 1914, approaches more nearly the reasonable and necessary assessment on the property than the cost of reproduction of it. It felt warranted in basing the valuation on its tentative valuation figures of 1919 (based on 1914 unit prices) as far as available, allowing for property added in succeeding years at actual cost less depreciation, without giving effect to the cost of reproducing the original property at present-day prices. The idea of cost of reproduction new at prices current on the valuation date, laid down as a rule in previous court decisions, was rejected by the majority of the commission on the ground that it would prevent stability of rates and that it was unjust and unworkable. Between that method and the use of 1914 prices as a base, the commission held no intermediate practice was "possible which is capable of being applied to any rule independent of the caprice of those who apply it."

The theory upon which the commission justified its adoption of 1914 prices appears to be that that price level is one which will be fair to all concerned. The idea of the commission seems to be that if the carriers are protected in their right to earn a fair return upon a value for physical property so determined, with some allowance for going concern value and working capital, fixed in the discretion of the commission, the roads will have no ground for alleging confiscation and will have received all the returns that can justly be claimed by owners of property who have voluntarily dedicated it to the public service.

These comments, it is believed, summarize the various points of view of the commission and the court correctly. So far as the railroads are concerned, the opinion of the general counsel of the Association of Railroad Executives is to the effect that even admitting that the road might be receiving a fair return upon its own valuation figures, the decision had the effect of preventing the road from receiving a return as great as Congress deemed it entitled to receive. The feeling of the railroads appears to be that the court decided the case without consideration of the correctness of the value placed by the railroad on its own property.

It is understood that the Supreme Court will hold an open session on Dec. 19 to consider motions for perfecting an appeal. It is expected that in that proceeding the issue will be decided of whether the highest court will finally direct the commission to give greater weight than it appears to have done to the present reproduction cost as one of the criteria of values and perhaps also whether it will direct the commission to accompany its findings of value with a definite statement of the manner in which it gave weight to reproduction cost. Should the court by chance decline to pass upon the valuation and confiscation questions and affirm this adverse ruling the railroads would be back where they started.



A hinged tripod, together with a standard jack, is used to push armature bearing housings from their seats



Method of storing armatures in one of the baking ovens of the railway





At left—The pressing of vestibule corner posts and other large members after gluing is done by special presses.
At right—Equipment used to test heater coils to insure uniform resistance



Machine used for cutting tongued-and-grooved flooring.
The insert shows the type of flooring used



Staple driver for making repairs to seat cushions without removing seat parts





At left, heated insulation compound is poured into the motor frame, which is rotated so that the compound fills all corners and inaccessible places. At right, polarity of the fields is checked by a compass

Special Devices

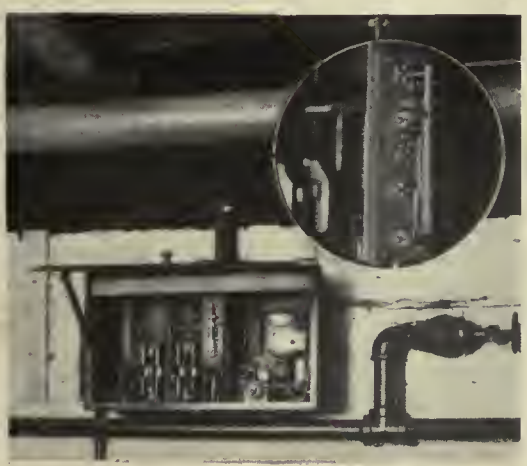
IMPROVE MAINTENANCE

in Chicago Shops

MANY improvements made recently in shop practices and equipment of the Chicago Surface Lines have resulted in greater efficiency and output and reduced maintenance costs. On a system the size of the Chicago Surface Lines shop work is important. Many details of maintenance practice and equipment are given in the company's brief for the 1927 Coffin Award. In the two principal shops of the system there are 34 persons in a supervisory capacity and 978 employees. In the repair and cleaning departments of the car stations there are 64 supervisors and 1,361 employees, making a total of 98 in supervisory positions and 2,345 employees. Some of the shop practices are given in the following paragraphs.

In overhauling motors one of the first operations is to remove the armature. Considerable time and labor have been saved in the removal of armatures from box frame motors through a special device built in the shops. It consists of a hinged tripod, two legs of which hook into the motor commutator cover hole, while the third leg hooks into the bottom inspection hand hole. Pressure on a jack placed between the apex of the tripod and the end of the armature shaft causes the armature to push the pinion end bearing housing from its seat, after



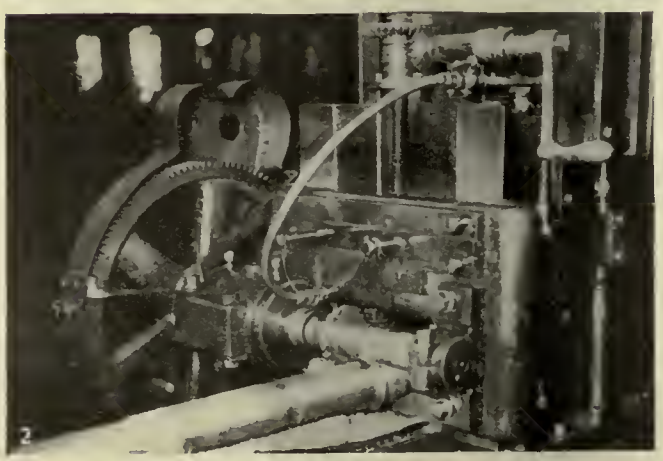


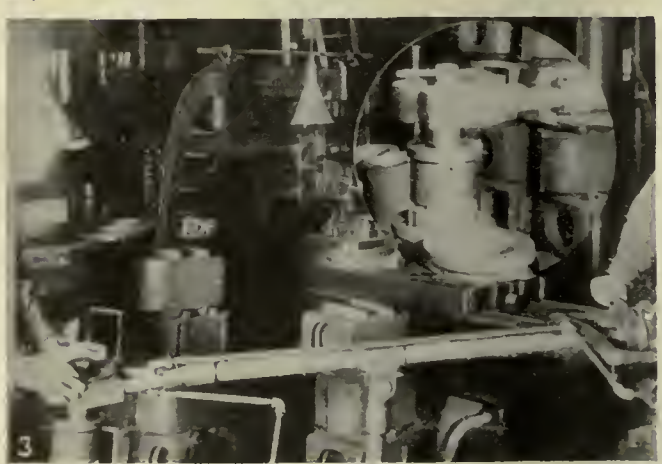


The clock (at left) controls four heat circuits. The switch (above) controls oven temperature. The insert shows details of the switch.

Heater units (at right) are placed below plates which support containers for insulating compounds. One of these units is shown in the insert.









Equipment used to finish armature shafts and make air brake repairs

1. A Landis grinder finishes the armature shaft to required size.
2. After threading for the pinion nut, keyways are cut.
3. A special reaming attachment is used to recondition air compressor cylinders that have become worn out of round or tapered.
4. Machine for running in crankshaft bearings.

which the armature can be withdrawn from the frame without difficulty.

The practice of dipping and baking armatures is carried out very carefully. It has been followed since 1922 and extensive facilities have been provided for the care of the 12,000 armatures used by the system. Details of some of the baking oven equipment by which the capacity was increased considerably were given in ELECTRIC RAILWAY JOURNAL for March 20, 1926. The method of storing armatures during baking so as to get a maximum number in a limited space is a particular feature. Clamps for handling armatures by the overhead rail conveyor system with chain hoist have assisted materially in rapid handling and also in reducing the amount of labor necessary.

Control of the oven temperature at the South shops of the railway is by means of a seven-day clock and contactor panel. The clock controls four heat circuits. Three sets of heaters are turned on at 4 p.m. and off at 6 a.m. each day except Saturday, while the fourth is under thermostatic control during those hours, so that it cuts in and out as the temperature varies in the oven.



Circular fixture for supporting motor frames during welding

At the West shops of the company three circuits of heaters are used, two being under thermostatic control established through a contactor and quick break switch, actuated by a length of No. 00 copper trolley wire placed at the top of the oven and anchored at one end so that all expansion must take place in one direction. As the temperature rises the expansion of the rod causes the switch to operate at a predetermined point. This control and quick break switch are of shop design and manufacture, but have been found more reliable than some other types of thermostats.

Insulating compound is also used on the inside of motor shells. For heating this compound an electric heater made of six 1,000-watt heater units has been placed below plates which support the compound containers. The heating compound is poured into the

motor frame. By rotating the frame about its axis the compound fills and insulates corners and surfaces that are inaccessible to a brush. A system of taps and switches has been devised so that the same current used in the compound heating element can be used in the testing of polarity and insulation of the motor. Polarity of fields is checked with a compass.

Where the housing fits in railway motor frames are worn it is the practice to build these up by welding and then to rebore them. To assist in handling the motors conveniently while welding a special fixture has been constructed. This consists of a circular cage formed from a hinged framework mounted on a truck with small roller castors. The motor in its cage can be hauled about to a convenient location for welding and also transported for assembling. To place a motor case in the cage the upper half is swung back on its hinges



Low portable scaffold used for painting the upper parts of car body sides

and the motor is placed in the lower portion. The top part is then closed into position and the clamping studs around the outside are adjusted to hold the motor rigidly. The cage rests on rollers at the bottom so that it can be rotated with the motor case inside. It is thus possible for the welder to place this in any convenient position and the welding work is not hampered through the operator having to work in a cramped position.

After welding, the motor frames are rebored in a twelve-tool boring machine, which is essentially a four-spindle horizontal boring mill. The four spindles are grouped in pairs of two in such a manner that all four bores are completed at the same time. Speeds can be adjusted to suit the thickness and hardness of the welded material in each built-up frame.

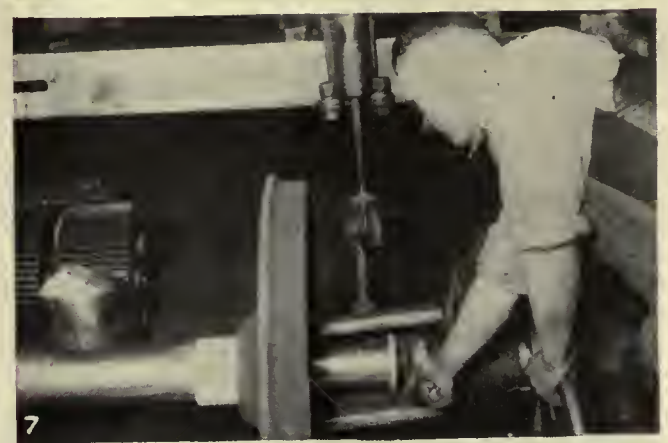
Armature shafts are turned out on a production basis in the Chicago shops on a group of machine tools. The rough shafting is first centered and then rough-turned



5



6



7



8

5. Intake and exhaust valves are seated by power grinding.

6. This wheel press is arranged so that two wheels can be pressed on the axle at the same time.

7. A special U-shaped block is arranged so that the thrust is taken by the hub of the wheel instead of by the end of the axle.

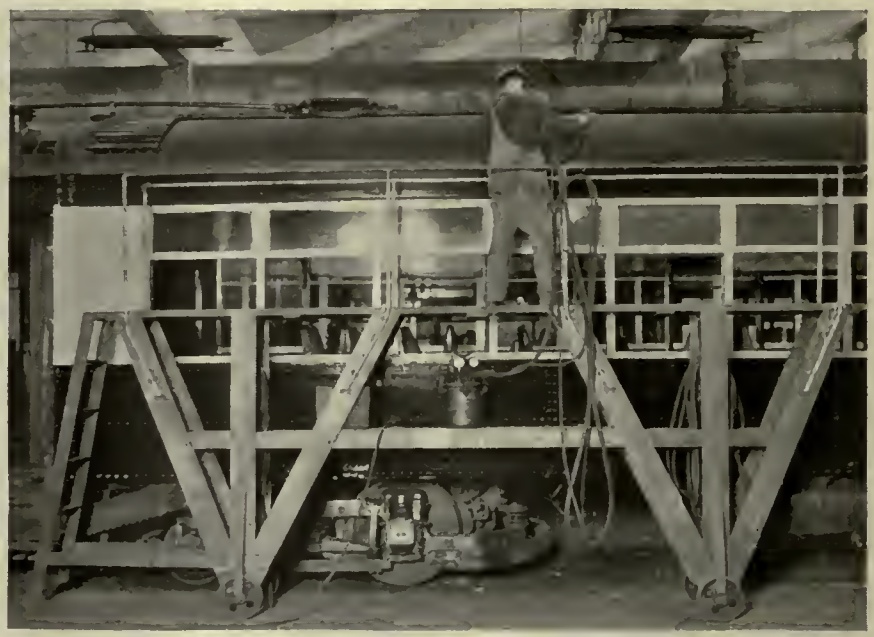
8. Door stiles and rails are formed in a machine with two horizontal spindles.

in an ordinary heavy-duty engine lathe. Finished turning is done in a low-swing lathe which has multiple tool posts. The saving in time resulting from the simultaneous use of four, five or six tools, combined with the use of cooling fluid, greatly reduces the cost of manufacture. A Landis grinder finishes the shaft to the required size. Finally, after threading for the pinion nuts, the keyways are cut.

All armature shafts are made of chrome-nickel steel. With this material, which has been the standard of the railway since 1921, breakage of shafts has been practically eliminated.

In the compressor overhauling department new rings and pistons are fitted to compressors until the bore has reached $\frac{1}{16}$ in. oversize, at which time a sleeve is fitted to bring the cylinder back to standard. Cylinders worn out of round or tapered are refinished with a special reamer. It has a micrometer adjustment and a true, smooth surface is secured. After a crankshaft is fitted the shaft is run in the bearings with a special machine. Two compressors can be run in at one time. Besides running the bearings, the machine is used to check the tightness before the motor is assembled. A power grinding attachment arranged for seating intake and exhaust valves has proved a great time saver and produces accurate work.

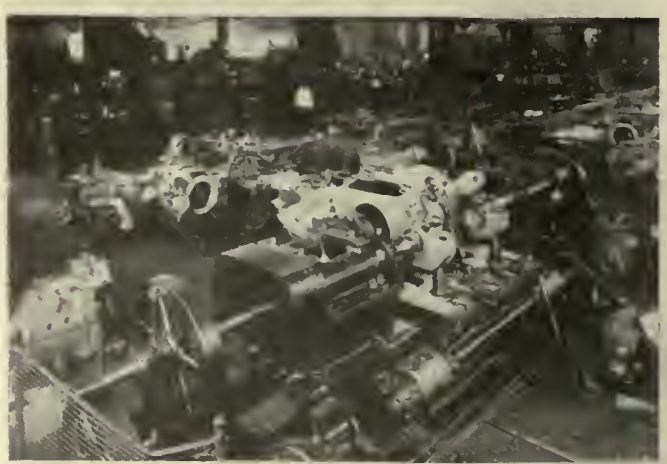
The wheel press used in the Chicago shop is so equipped that two wheels can be pressed on the axle at one time. The new equipment required to adapt the machine to double end pressing includes a U-shaped block similar to the one used on the piston end. This is placed in such a way that the thrust is taken by the hub of the wheel instead of by the end of the axle. Whenever it is found that the fixed end wheel will be pressed on farther than the gage mark on the axle before the other wheel is in its proper place an emergency stop, consisting of a block of iron, is slipped into a groove in the U-shaped fixed stop, after which the thrust is taken by the end of the axle and the second wheel can be pressed into place. If the piston end wheel arrives at its place first the iron block is placed between the piston and the axle end and the pressing on of the other wheel is completed. This procedure increases the production of the press by 90 per cent.



High type scaffolding used for spray painting roofs of cars

Many improvements in methods and equipment have been made in other shop departments. In the wood mill the edges of door stiles and rails are formed in a machine with two horizontal spindles, using shimer head cutters so that both edges of a piece passing through can be finished at the same time. Presses have been constructed to give pressure to vestibule corner posts and other large members after they have been glued. These presses hold the parts in position firmly until the glue can set. An improvement in platform flooring has been made through the use of an improved type of tongued-and-grooved flooring. A special machine is used for cutting this. This type of flooring gives much longer life than the usual type. Repairs to seat cushions are made without removing any part of the seat by the use of a special staple driver. An accompanying illustration shows its construction and use.

Work of painting the sides of cars has been facilitated greatly through the use of several types of rolling plat-



Twelve-tool motor frame boring machine used for finishing after welding



Shafts are finish turned in a low-swing lathe with multiple tool posts

forms. These platforms are made of different heights so that workmen can reach all parts readily. They are mounted on large wheels so that they can be pushed along by the workmen without getting down from the platform.

An average of 4,870 cars are given a general washing each week on the Chicago Surface Lines. To aid in this work a fountain brush has been designed. It is so arranged that water is sprayed through the brush bristles directly on the car surface. Dirt is loosened with the brush and the steady flow of water flushes off the loose dirt. Care has been taken to prevent the use of water at higher pressure than necessary to secure a uniform flow through the brush. This prevents the entrance of water into cracks or crevices of the car and prevents the deterioration which is usually experienced where high pressure cleaning systems are used. Low pressure water also makes working conditions for the men more comfortable.

But four men are required to clean a car. Long and short handles are supplied to the fountain brushes and a special brush is also used to clean the glass behind the window bars. Periodically the cars are given a thorough interior cleaning and are swept and dusted after each day's run.

The care used in inspecting and purchasing repair parts which go into cars is illustrated by the attention given to securing uniform heater coils. To make certain that all coils have the correct resistance for the circuit in which they are used, independent of the resistance of the wire purchased, a special testing equipment is used which is an adaptation of the Wheatstone bridge in which a known resistance is balanced against the heater coil being tested. The known resistance is a standard heater coil. Coils are wound on a mandrel and are cut to such a length that the resistance will balance with that of the standard coil. In the illustration on page 1092 showing this test equipment a dry cell furnishes the electric current. The galvanometer to show when a balance is obtained is at the top of the board and the coil under test is around the outside.

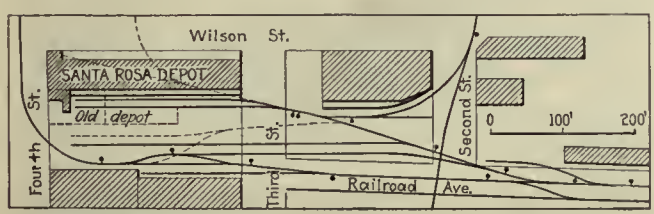


Diagram showing old and new locations of depot and tracks

Attractive Depot Completed at Santa Rosa

COMPLETING a new combined passenger and freight depot, costing approximately $30,000, the Petaluma & Santa Rosa Railroad has given to Santa Rosa what is said to be one of the finest depots in northern California. This road operates an electric interurban in Sonoma County between Petaluma and Santa Rosa via Sebastopol and a steamboat line on San Francisco Bay between San Francisco and Petaluma.

Of modernized mission style of architecture and tastefully decorated, it is a distinct improvement over the former structure. It provides for the traveling public a commodious waiting room and ticket office separate from the freight warehouse. The building has a frontage of 84 ft. on Fourth Street, one of 270 ft. on Wilson Street and a total floor space of 25,000 sq.ft.

The passenger end of the depot, with its entrance on Fourth Street, the principal business street of Santa Rosa, is constructed of reinforced concrete, with a stucco finish and tile roof.

The adjoining freight warehouse, devoted entirely to the receipt and delivery of l.c.l. freight, has a 270-ft. frontage on Wilson Street and a 47-ft. frontage on Third Street. Inside dimensions are 40x250 ft. The floors of the warehouse and the 7-ft. platform on the car side are of concrete. The vehicle-loading side is fitted with Cahill roller steel doors, 16 ft. wide and 12 ft. high, and has a 4-ft. marquee extending the full length of the building. A concrete drive, also the full length, adjoins the paving of Wilson Street. The opposite side is served by two tracks, each having a five-car capacity.

The change in location necessitated a complete rearrangement of the tracks. The accompanying diagram shows the present arrangement in solid lines and tracks removed in dotted lines. Driveways and track changes cost $10,000.

Before the contract was let the railroad company prepared for building by tearing up the tracks and getting everything in readiness for construction, so that there was no interference with the business of the company and service was given as usual while the work was in progress.

W. G. Rennison, chief engineer of the company, supervised the construction of the station and all changes made in the track and driveways.



New Santa Rosa depot of the Petaluma & Santa Rosa Railroad is of modernized mission architecture

Asphaltic Concrete

Used in Oregon City Track Reconstruction



Street before reconstruction work was begun



Stone block surface being removed from track area



The street after the ties and rails had been removed. The large chunks of concrete were salvaged



Excavating the trench with a caterpillar tractor and Fresno



The material was loaded into trucks with a clamshell bucket

RECONSTRUCTION of 2,300 ft. of the main line street car tracks through Oregon City, Ore., proved a difficult problem for the Portland Electric Power Company, owner of the local street railway system. The line carries a considerable quantity of freight to the paper and woolen mills in addition to handling the regular interurban passenger service between Oregon City and Portland. The main business district of Oregon City lies on a narrow bench between a high bluff and the Willamette River, and practically all vehicular traffic must pass over Main Street, on which the railway line is located. The track and pavement had deteriorated to such an extent that it was decided to rebuild the entire structure. Because of the heavy traffic, both vehicular and rail, it was necessary to complete the work in a minimum period of time. The subgrade of Main Street, composed of poorly drained subsoil, offered another problem to solve.

The method of reconstructing the old track, as outlined in an article in *Construction Methods,* is very interesting. The old Belgian stone block surface in the track area was removed and salvaged. The ties, which were imbedded in concrete, were removed with a portable crane mounted on a truck. A large pointed hook was fastened to the end of the crane cable and this hook was driven into the ties with a sledge. After the ties and rails were taken out there was left a mass of loose material to be removed. The large chunks of concrete, which may be seen in an accompanying illustration, were salvaged and later used for riprap. The trench was excavated with a tractor and Fresno, starting at one end of a section, dumping at a predetermined point, continuing down the trench and bringing back material. The waste material was then loaded into a truck with a clamshell bucket crane. The completed trench was slightly more than 8 ft. wide and 21 in. deep, a template being used to obtain



Obtaining a uniform thickness of 21 in. with a template

a uniform thickness. The subgrade was finished by compacting with a roller.

On this subgrade an asphaltic concrete base approximately 8 in. in thickness was laid. Large aggregates were used in the material, which was laid in two courses. Over this base a thin layer of screenings was spread, on which the new track was placed. The track was brought to grade by working the screenings under the ties where necessary. The space between the ties and under the rails was then filled with asphaltic concrete base mixture, hand tamped into place. The rails were painted and another course of the base mixture laid above the ties. On this second course the surface pavement was laid, bringing the wearing surface to final street grade.

In making the asphaltic concrete, the maximum density type of mixture was used throughout. In the base course a fairly large-sized rock was used, the maximum being



The finished asphaltic concrete base. A coating of fine screenings was spread over the base course

2½ in. In the surface course ½-in. maximum sized rock was employed. Asphalt of 51 to 60 penetration was used in the mixture, the base courses carrying approximately 4.5 per cent and the surface courses carrying approximately 6.7 per cent.

The work was done under the supervision of Thomas Pumphrey, chief engineer of railways for the Portland Electric Power Company, working with J. R. Stafford, city engineer of Oregon City. The contractor was the L. O. Herrold Company.



The ties and rails were then laid and the track brought to grade



Painting the rail before laying the black base on top of the ties



Tamping the black base mixture into the space under the rail



The completed wearing surface

Catenary with Unusual Pole Spacing

Withstands Cyclone

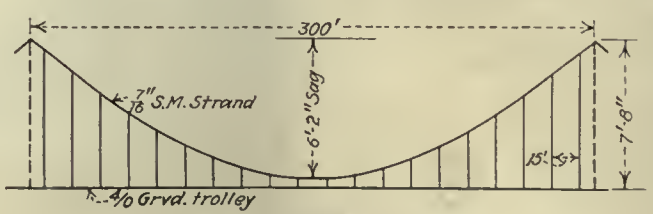
By L. W. Birch
Line Material Engineer Ohio Brass Company, Mansfield, Ohio



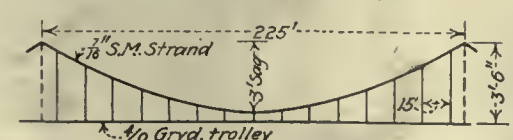
On the multi-track sections the catenary is supported on steel bridges with 300-ft. spacing. In this view is seen the catenary suspension and the direct-suspension trolley which it replaced

EARLY in 1923 the Havana Central Railroad began a study of overhead systems, expecting at some future date to replace the existing overhead with something more positive and economical. The result of this study was the selection of a light catenary system suitable for long spans and capable of replacing the existing direct-suspension system with a minimum amount of pole relocation. This work was started in 1924 and has been continued steadily, until at the present time the Havana-Rincón Division and the four-track section leading from the Estacion Central through the yards have been completed. Plans are made to continue this rebuilding until the overhead system will be entirely reconstructed.

A program of this nature cannot be carried out with the same speed and consistency as a new installation. Such factors as traffic, change of height of system and utilization of existing wood poles and structures are responsible for much delay and changes throughout the construction program.



300-ft. span on steel bridges



225-ft. span on wood poles

The Havana Central Railroad is a subsidiary of the United Railways of Havana & Regla Warehouses, Ltd. The company was incorporated in 1905 and acquired the right of the then Insular Railway for the construction of 120 miles of road radiating from Havana as the central point. Construction commenced in 1907 and at the end of 1923 a total of 62 miles of railway had been built. In 1907 the stock and bond issues of the Havana Central were bought by the United Railways of Havana.

The Havana Central thus became a part of the largest railway system of the island of Cuba. Its entire system is electrified, while the Western Division of the United is electrified as far south as Rincón and throughout several shorter suburban lines. The electrified lines provide excellent suburban service through three lines radiating from Havana, located approximately 45 deg. apart. They are Havana-Guanajay, 30 miles; Havana-Güines, 32 miles, and Havana-Rincón, 15 miles. The systems are supplied with power from the company's power



Sections of the electrified line showing the old direct-suspension system being replaced by catenary. In the center view is shown one of the steel bridges used for a portion of the line

house, located at Havana, at a trolley voltage of 600 d.c.

In the overhead construction, to reduce accident hazards, increase signal visibility and facilitate switching in the yard sections, long spans and considerable side clearances were necessary. In this case consideration of existing structures and poles was unnecessary. However, on the single-track main line divisions, where the wood poles were spaced 112 ft. with direct suspension, the problem of utilizing many of the existing poles was encountered.

The poles, due to proper maintenance, were found to be in good condition. Naturally, initial cost suggested the use of present pole locations, rather than entire relocation. But a pole spacing of 112 ft. is not inviting to the engineer wishing to show a low first cost on the installation. Neither is it attractive from the maintenance standpoint, because in a humid climate pole maintenance is greater than usual.

The result of a careful investigation of the yard work was the choice of a 300-ft. simple catenary span constructed with a $\frac{7}{16}$-in. Siemens-Martin messenger wire and a No. 0000 grooved contact wire giving a total weight per foot of 1.0 lb. Both the messenger wire and trolley



Appearance of 225-ft. wood pole catenary after the cyclone passed. The overhead was quickly realigned and operation resumed in record time

wire were strung at a tension of 2,000 lb. at the normal temperature of 80 deg. F. The system was supported from latticed steel bridges which also carried pole extensions for a double-circuit three-phase, 33-kv. transmission line. The messenger wire was supported by 35-kv. pin type insulators mounted on the top chord of the truss. Owing to the slight curvature on this section the overhead was aligned with the track by attaching pull-over wires to intermediate Bates poles. Steady wires were placed at each structure.

On the single-track line it was found economical to continue the same tension and span design. The span length was decided by choosing every second pole location. This produced a 225-ft. spacing, which is 75 ft. greater than the usual spacing of wood poles on tangent track. However, with a temperature variation of only 25 deg. F. (70 deg. to 95 deg.) a favorable condition existed for this spacing, inasmuch as comparatively slight variations in mechanical loadings were encountered. Another favorable factor in the selection of the longer pole spacing was the soil encountered. Immediately around Havana there is to be found a fiery red soil, indicating a high iron content. It is not a clay soil, but is composed chiefly of decomposed limestone, sandstone and gypsum and is exceedingly good for pole foundations. Further, a single-circuit, 33-kv. line placed on top of the poles in several locations served to strengthen the line longitudinally. Poles were mostly of creosoted Southern yellow pine imported from the States.

On Oct. 20, 1926, Havana and the surrounding territory were badly damaged by a cyclone which, from the standpoint of wind velocity and loss of life, greatly surpassed the Miami disaster and preceded the Cuban cyclone by only three weeks.

The wind velocity registered on the government instruments previous to their destruction reached 100 m.p.h. Thousands of telephone, power and railway poles were leveled. The steel bridges on the four-track section of the Havana Central were supporting only the transmission lines. Consequently, little damage could be expected, and the actual damage was negligible. The single-track direct-suspension lines employing 112-ft. pole spacing approached a total loss. Poles were leveled, bracket arms torn loose and the relationship of the double trolley wires to ears and hangers was completely lost. The rebuilding of these sections was accomplished only by completely cutting away trolley wires from poles.

On the new catenary system, particularly the Rincón section, where poles were spaced 225 ft., the damage appeared to be as great as on the direct-suspension lines. However, after eliminating a few leaning poles, this damage was found to be small. The spans remained intact and the lines were quickly cleared and restored to an operating condition by realignment of poles and bracket arms. Very little time was lost through catenary maintenance, and it can be said the electrical department found it necessary to charge only a small per cent of its $236,000 cyclone figure to this account. The repair work, as well as the original building of these new systems, was accomplished by G. B. Fielding, signal engineer, under the direct supervision of J. A. Thomson, chief electrical engineer.

Trolley Car Operated by Radio

Little Rock Coffin Brief gives details of the demonstration that was conducted in that city

EARLY in 1927 the Arkansas Power & Light Company, which operates the street railway system in Little Rock, Ark., gave a demonstration that an electric car can be run through city streets safely without any one at the controller. The explanation perhaps should be made here that the company has no intention of trying to run its cars without operators. It was simply a matter of scientific interest and incidentally was a good advertising feat because thousands witnessed the trial, considerable space was given to it in the local press and a news reel was made by a moving picture company. The company's brief for the 1927 Coffin Prize contest gives particulars of the wireless system used.

To avoid any possible embarrassment through the failure of the remote radio control, a private demonstration was first given at the carhouse by the radio expert, Maurice J. Francill, who had charge of the trial. His success in controlling the movement of the car with a delicate 5-lb. instrument removed all doubt from the mind of the superintendent of transportation and his consent for a public demonstration was secured. Plans were soon made and a demonstration was arranged.



Operating a car in Little Rock by radio control

Considerable advance publicity had been given to the event, which took place in the downtown section of the city on the afternoon of Thursday, April 7, 1927, so that many people were on the sidewalks to see the trial.

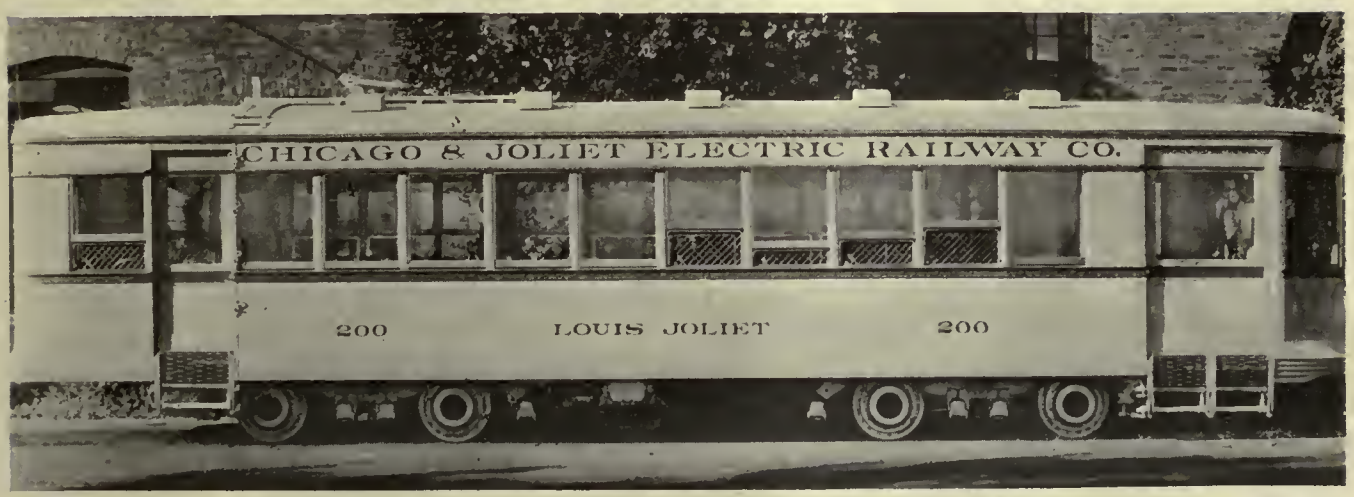
At the proper time the demonstration car was brought from the carhouse to the downtown starting point on its own power. The radio expert followed in an automobile. After the brief ceremony of loading the Mayor of the city and a group of other distinguished citizens on the car the regular operator stood back and permitted the radio man in an automobile to start the car. He got off with a good start, running the car on two notches. At the street intersections the radio-governed street car complied with the traffic signals. It continued its run for about fifteen blocks.

As a natural precaution against possible accidents, the operator remained on the car in a convenient position so that he could take charge of it in the event of an emergency, but no such occasion arose.

The experiment has not been repeated, but the Little Rock company believes that it is the first electric railway company to have one of its regular cars driven through street traffic by radio control.

Light Weight
Features Joliet Car

By J. R. Blackhall
General Manager Chicago, North Shore & Milwaukee Railroad
Formerly Vice-President and General Manager Chicago & Joliet Electric Railway



The front door opening is wide enough to afford both entrance and exit facilities. The rear door has treadle control

Use of aluminum in car body brings weight per seat to 475 lb. High acceleration and braking rates combined with slightly increased free running speed have reduced schedule time

EXPERIENCE in the use of lighter weight cars in city operation in Joliet, with the resultant savings in capital investment and labor costs and the possibility of maintaining faster operating schedules, seemed to point the way toward the attainment of similar results in interurban service. Accordingly ten cars for our interurban service were purchased to replace the heavier equipment then in operation. These cars were built according to the railway's design and specifications and included some features new to cars of this class. They are of two distinct types, although all are designed for one-man operation. Six are of the one-end type for through interurban service and four are of the double-end type for local interurban service. The cars were delivered and put in service in September, 1926.

The outward appearance of the ten new cars was carefully worked out with the idea of appealing to the riding public, which has been educated by the motor coach lines to expect parlor car appearance and equipment. Streamline effects and attractive color combinations helped in this matter. Concealment of interior equipment, such as switches and air piping, in mahogany finished cabinets added greatly to the attractiveness, and a final touch was obtained by the use of bucket type, semi-individual passenger seats of leather and plush. Interior lighting was of the semi-indirect type, eliminating all glare. Sliding doors replaced the conventional folding ones, adding not only to the general appearance but eliminating a good deal of noise and also reducing maintenance cost.

The new cars weigh 39,000 lb. each, as against approximately 62,000 lb. for the type of car they replaced. They have four 35-hp. motors, where the older cars required four 100-hp. motors.

Whereas the older type cars could not maintain schedules, due to the increasing number of stops per mile, the new light-weight cars have reduced the time between Chicago and Joliet by ten minutes with but slightly higher free running speed. Quicker acceleration and quicker braking are responsible. The public has been quick to appreciate the improved service thus offered as well as the increased riding comfort of the new type cars. An increase in traffic has resulted.

When the new cars were purchased it was estimated that a return of about $40,000 per year would be realized on the investment of $168,000 as a result of operating economies and because of increased patronage. The reduction expected in operating expense was figured at $30,000 and the increased revenue at $10,000.

New wage rates for operators put in effect in January, 1927, tend to reduce the saving, but a study of operating

costs shows a reduction of $17,320 for eleven months in spite of the increased wages, and the gross earnings over the same period show an increase of $18,966. From this it would appear that the original estimate will not be far wrong in spite of the increase in labor costs. The one-man operation has resulted in a labor cost reduction of 2.46 cents per car-mile in an eleven-month period, a saving of 35.9 per cent after allowing for the increased rate of wages.

The average energy saving has been 20.3 per cent, due to the lighter weight of the cars. The average energy consumption per mile of the old type car was 2.76 kw.-hr., against 2.20 kw.-hr. for the new type.

Reductions in Maintenance Cost

After operating the cars for nearly a year it has been determined that there is a saving also in the maintenance of track, roadbed and equipment. There are no figures to show just what this saving is, but it is considered reasonable to place it at a minimum of 1 cent per mile. On the basis of the year's mileage this means an additional saving of more than $10,000. The actual saving in maintenance is not as yet available, but it is believed that it will be similar to that of other companies operating this type



Floor and ceiling of car have been designed for beauty as well as wear

of equipment and that it will run close to 30 per cent. The net increase on the three items mentioned totals about $50,000 per year, which is a return of practically 30 per cent on the investment in the lighter equipment.

It is of interest that while the gross earnings of the interurban line were being increased to the extent of 6.06 per cent the Joliet city line suffered a loss of 1.22 per cent in earnings in the same period due to a decrease in operating revenue of $4,072.

With all these facts in mind it was felt that if such results could be obtained with a light type of steel car we might, by use of a lighter metal, obtain additional economies as to operating costs, and, as far as possible, additional revenue from traffic increase due to greater riding comfort and better service. We proceeded accordingly, during the past year, with two innovations from which we confidently expect further economies, based on our past experience. First is a new type of truck, using an automotive type axle with roller bearings, a differential and a worm drive. The second is an aluminum car body of our own design to be used with this type of truck. We expect also to use aluminum in truck construction, but this is to be worked out a little later.

The aluminum car body was shown at the electric railway convention in Cleveland. The new type trucks have been in operation on one car of the ordinary type since May 19 and the results have exceeded our expectations.

Features of the New Car

Briefly, the features introduced in this new design of a one-man, single-end car are: (1) Automotive type axle with differentials; (2) roller bearings and worm drive; (3) fixed truck bolster; (4) aluminum car body; (5) automatic heating through dynamic conversion of the wasted kinetic energy of car braking to heat energy within the car; (6) utilization of the heat energy of the starting resistor for car heating. These all make for more economical operation and more comfort. This particular car was designed for city service in Joliet, but there is no reason why it could not be used for interurban service if the speed ratios were stepped up and several other minor changes were worked into the design.

The semi-floating type of axle has its bearings located directly over the tread of the wheels. The axle housing completely incloses these bearings. The use of differentials eliminates slippage of wheels on curves and the worm drive permits use of a motor of high speed with a single gear reduction, thereby affording a large reduction in weight as compared with a standard railway motor of equal power rating. This weight reduction is strikingly borne out by consideration of the following figures:

Type Truck	Motor Rating, Horsepower	Motor Weight, Pounds
Automotive	28	410
Former (common type)	25	1,000 with gears, approx.
Former (used on light-type steel cars)	35	1,500 with gears, approx.

Two motors are carried on each of the two trucks. They are connected by means of a driveshaft and two universal joints through the worm drive to the axle with an $8\frac{1}{2}:1$ ratio. Instead of the customary floating type, a fixed bolster is attached rigidly to the side frame. It depends for flexure entirely on the long, semi-elliptic springs, underslung from the axles and attached to the truck side frame by shock-insulating rubber blocks.

The trucks are attached to the car body by an interlocking center bearing without a kingpin. A rubber pad is inserted between the center bearing and the body bolster. Rubber pads are also used between the side bearing plates on the car and the truck frame. These rubber pads, together with the rubber spring supports, all tend to absorb vibration and prevent its being conveyed to the car body. The 26-in. wheels are of rolled steel, held on tapered axles by a large nut and key. A rubber cushion between the tires and hubs of these wheels is designed further to eliminate noise.

The drum brakes, of the air-operated, internal-expansion type, have a diameter of $17\frac{1}{4}$ in. They are mounted inside the wheels and are operated by a diaphragm on each axle housing. Each brake has four shoes of a special composition used on this type of equipment for the first time. Air is conducted to the diaphragms by $\frac{3}{8}$-in. tubing with flexible connections between tubing on the car body and that on the trucks. Use of this type eliminates all brake levers, links and toggles. The special composition used eliminates the familiar squealing of brakes. Experience to date shows a much longer life for

the new type of brakeshoe. The old type was good for 5,000 miles and needed many adjustments during that time. The new ones on the trucks in use have been run 10,000 miles with no adjustments and the indication is that their life will be from 30,000 to 40,000 miles.

Complete support of the motors on the truck frame, which is in turn supported on the long semi-elliptical springs, is expected to result in a material reduction in motor maintenance cost. The construction used has practically eliminated all the inherent noises of street car trucks and brake rigging. The new rubber-cushioned wheels have eliminated the ringing noise of the wheels on the rails and have made the car as void of noise as a modern automobile operating on good pavement.

What is believed to be an innovation in heating systems is the conversion of kinetic energy from braking the car into heat energy, together with energy loss from the starting resistors. There will be a supplementary set of ten 500-watt heaters of the ordinary type as a reserve system.



Control equipment is all located in the front vestibule

No failure has been experienced to date with the light-type truck. The gears, axles and bearings were examined thoroughly at the end of 6,000 miles, but no perceptible wear was found. The manufacturer, basing his statement on these facts, estimates that the life of these parts may well be 1,000,000 miles.

Power tests on this type of truck in comparison with one of the old type, both used with the 22,000-lb. city-type bodies, show that the coasting qualities are 10½ per cent better. Accelerating characteristics are 25 per cent better with a total motor capacity of 112 hp. than for a car with the old trucks having a total motor capacity of 120 hp. The maximum service braking rate is 11 per cent higher. The free running speed is 12 per cent higher. With the new aluminum car body we expect that this increase will range from 30 to 40 per cent higher than with ordinary trucks and bodies. We likewise expect the acceleration and braking rates to be increased, as the new body will weigh 10,600 lb. as against the present body weight of 22,000 lb. Until tests can be run no energy savings can be determined accurately, but we believe we are conservative in expecting at least a 20 per cent saving in this item.



Cabinets for equipment parts give neat appearance

The Body Is Made of Aluminum

The new aluminum body is of the single-end type with a front door opening wide enough for both entrance and exit. There is a treadle-operated rear door for exit only. The step-well was eliminated, without increasing step height, by use of double folding steps at both ends, giving steps of $10\frac{3}{4}$ in. and $11\frac{7}{8}$ in., respectively. The control equipment is all located in the front vestibule in the least fatiguing position for the operator.

Both ceiling and floor of the car have been designed for beauty and wear as well as for comfort. The vestibule ceiling is of sheet aluminum and the interior below the window sill is lined with heat-treated notched sheet aluminum. In the body itself aluminum alloy castings are used for condulets, drawbar anchorages, heater casings and door engines. Aluminum alloy plate, sheet pressings

and structural shapes are used in the construction of cable boxes, lighting fixtures, drawbars, ventilators, trolley base, trolley pole and harp, headlining, trolley retriever, window guards, destination signs, underframe bolster, anti-climber bumpers, step-treads and doors. Wherever strength is required the aluminum is heat-treated, giving it the same properties as structural steel. The only structural steel used is on the two outside platform sills at the entrance and exit doors, to which the step supports are fastened. There was no standard aluminum section heavy enough for these parts, so steel was used to save making special pieces. Aside from this the body frame is aluminum throughout. Seat frames and pedestals are also of aluminum and are of special design.



Except for two outside platform sills, car body frame is of aluminum

Genuine green leather upholstery is used. The seating capacity is 50.

Some of the principal car weights are as follows:

	Pounds
Weight of body complete with seats and accessories	10,410
Weight of trucks without motors	9,012
Weight of electrical equipment, including motors and heaters	3,600
Weight of air braking equipment and piping	700
Total	23,722

The weight per seated passenger is 474.4 lb., as against approximately 900 lb. with the present type car. An idea of the savings in weight over corresponding steel parts can be had from the following:

	From, Lb.	Reduced To, Lb.	Reduction, Lb.	Per Cent
Frame	7,000	2,600	4,500	63
Miscellaneous parts	....	....	2,000	..
Body	22,000	10,410	11,590	53
Air brake system	2,000	700	1,300	65

We found the cost of the aluminum car high due to the fact that most of the castings and specialties had to be made up for this job alone, entailing also additional pattern costs in some cases. An instance of this is a coupler casting which cost $59 in addition to a pattern cost of $60. Another is the price paid for special machine bolts. In steel the ⅜-in. x 2-in. size costs about 1 cent each; in aluminum these cost $2 each. Material for steel fenders made up in our own shop costs about $5, as against $35 for aluminum. These costs will hardly be overcome by savings in operating expense resulting from the use of aluminum parts, but the savings will, of necessity, remain in doubt until operating experience has indicated the amount by which repairs are reduced through the use of the aluminum parts. It should be borne in mind, however, that prices for aluminum castings and other specialties will be decreased materially when aluminum cars are built on a production basis.

Economies Justify Costs

The additional cost of the frame is amply justified by the operating economies effected. The 2,600-lb. aluminum frame cost $1,600, as against about $300 for a 7,100-lb. steel frame. This represents a saving in weight of 4,500 lb. We figure that our haulage cost covering power, maintenance, etc., amounts to 5 cents per pound per year. A saving of $225 is thus made each year on this item alone, enough to pay the additional cost of aluminum in about six years. Thus the additional cost for aluminum is amply justified.

Other advantages of aluminum are that it has less tendency than steel to rust and corrode and that wrecked or obsolete equipment will have greater salvage value as compared with steel. Lighter equipment, of course, needs a better conditioned roadbed to have riding qualities equal to those of heavy equipment. We feel that our experience justifies us in stating that, having put our roadbed in condition to handle the lighter cars satisfactorily, our maintenance costs will be less now than formerly, due to decreased wear. This will, we believe, more than offset the cost of putting the roadbed in the required condition. The advent of the one-man type of car also brings with it increased safety, due to control being centered in one man instead of being divided between an operator and a conductor.

We cannot as yet show any definite results, but we believe that we will have valuable experience with our new type trucks after they have traveled 100,000 miles and with our new aluminum car after it has passed through a period of active service. We feel that we are on the right course and that our hopes will be fulfilled. Light-weight equipment has shown itself successful in improving interurban line service and increasing profits from it. There is no reason to believe that the aluminum equipment will not go further in this respect.

We will do no further experimental work this year, but if the car proves the success we think it will be it is probable that we will build more like it.

New Jersey Stockholders on the Increase

DURING the six months ended June 30, 1927, a total of 10,570 new names was added to the stockholders' list of the Public Service Corporation of New Jersey. As a result of this gain the company had on its books June 30, 1927, 62,572 names covering all classes of stockholders, eliminating duplications where holders own either common and preferred or more than one class of preferred stock. The total of 62,572 individual stockholders reported on June 30 compared with total stockholders numbering 52,002 reported on Dec. 31, 1926.

Adventures of

Old Man Trouble

on the

Hicksville Railway



Cars may be protected against dead motormen, but one has to go some to protect them against fools



Safety equipment on cars will shut off the power, apply the brakes and sand the track quicker than the human mind can direct any one of these acts in an emergency. Don't tamper with them! Weights, wedges or fancy contrivances on the controller handle or the foot valve are always forgotten in time of emergency.



ELECTRIC RAILWAY JOURNAL will be glad to furnish press proofs of this page for posting on bulletin boards and will supply electrotypes of this series at cost for use in company publications.

J. M. Zimmerman and E. L. Proctor, West. Elec. & Mfg. Co.

Harold E. Bean

Wins the November Monthly Maintenance Prize

Means for straightening steel poles without removing them from the ground through the use of a simple fixture developed by the New York State Railways was awarded the $25 monthly prize for November in ELECTRIC RAILWAY JOURNAL'S *maintenance competition. A method of making up special work frogs for quick repairs received honorable mention. This was submitted by Louis T. Botto, superintendent of maintenance of way San Antonio Public Service Company, San Antonio, Tex.*



Harold E. Bean

TUBULAR steel trolley poles frequently are pulled out of alignment by loading or by the tension of trolley supporting span wires. Poles out of plumb present an unsightly appearance and also may pull the trolley wire itself out of alignment so that additional maintenance work is required at frequent intervals. To straighten the poles so as to keep up the appearance of the line, the New York State Railways uses a special fixture that provides a simple and cheap method for straightening a tubular steel pole. It can be used on any property without the necessity of removing the poles from the ground. A description of the fixture and its use was given in the Nov. 19 issue of ELECTRIC RAILWAY JOURNAL. It was submitted in the contest by Harold E. Bean, chief engineer of way and structures for the Syracuse lines of the New York State Railways.

A method of making up special work frogs for quick repairs submitted by Louis T. Botto, superintendent of maintenance of way San Antonio Public Service Company, San Antonio, Tex., was awarded honorable mention by the contest judges. This method of making up frogs for emergency replacement is quite ingenious. For a given blank center casting the range in frog angle is large and the cost of making such a frog should not be excessive. Frogs constructed as outlined in this article should have a life considerably in excess of that of an ordinary jump frog and should be much more satisfactory. Adequate strength is obtained through the use of acetylene welding.

The items selected for the November monthly prize and for honorable mention were two of the group of twelve published in the Nov. 19 issue. Items for the contest continue to come in and additional items appear in the following pages. One of these will be awarded the $25 monthly prize for December. Results of the contest each month are published in the issue of ELECTRIC RAILWAY JOURNAL devoted to maintenance and construction, which is the third issue each month.

The following gives a summary of conditions for submitting material in the contest. Complete details were published in ELECTRIC RAILWAY JOURNAL for April 16, pages 700-701.

1. Any employee of an electric railway or bus subsidiary may compete.

2. The author does not need to be the originator of the idea.

3. Articles may be submitted by several persons or by a department.

4. Any maintenance practice or device for electric railway or bus repairs may be the subject.

5. Articles should be 100 to 200 words long with one illustration, and in no event longer than 400 words with two illustrations.

6. Illustration material may be in the form of drawings, sketches, blueprints or photographs. All sheets should be marked "Maintenance Competition."

7. Manuscripts should be mailed to the editor of ELECTRIC RAILWAY JOURNAL, Tenth Avenue at 36th Street, New York.

8. A prize of $25 will be awarded each month for the best maintenance idea in the group published. A minimum of $5 will be paid for each article accepted for publication. Manuscripts will be received until April 30, 1928.

9. Announcement of the winner each month will be made in the issue devoted to maintenance and construction (the third issue each month) following the one containing the item.

10. Additional details were given in ELECTRIC RAILWAY JOURNAL for April 16, pages 700-701.

---

who was awarded the monthly prize for November in ELECTRIC RAILWAY JOURNAL'S Maintenance Contest, is chief engineer of way and structures for the Syracuse lines of the New York State Railways. He has held this position since 1920, and for two years previous to that was assistant engineer of way and structures for these lines. Mr. Bean's electric railway experience began with the New York State Railways in Rochester in 1912 as mechanical draftsman. Two years later, after having served as building inspector on new construction, he was appointed superintendent in charge of underground circuits, and also had supervision of parks, return circuits and inside wiring. In 1917 he was made superintendent of distribution of the Rochester City lines of the company.

In his present position Mr. Bean has jurisdiction over all construction and maintenance of track, transmission lines, substations, d.c. distribution and buildings for the Syracuse lines of the New York State Railways. He has been very active in committee work of the American Electric Railway Engineering Association for several years, and has been a pioneer in the development of welding for manganese track construction.

Electric Railway Journal Maintenance Data Sheet

BUSES AND TRUCKS—9

Machine Reduces Difficulty of Tire Changing*

By D. S. MacKay
Supervisor of Automotive Equipment Boston Elevated Railway, Boston, Mass.

NEARLY all of the 235 buses operated by the Boston Elevated Railway are equipped with solid disk wheels. Tire changing in connection with them is quite expensive. To decrease the labor required, the foreman of one of the bus garages devised the machine shown in the accompanying illustration.

A rugged, heavy, portable stand was constructed with a coarse threaded stud projecting upward. A spider with four radial arms slips onto this stud and a pressure shoe, arranged to engage the tires with lock rings, slides back and forth on each radial arm so as to accommodate any diameter of wheel. A threaded pressure wheel screws on to the stud above the spider so as to enable one man to apply great pressure to the tire or lock rings.

Some of the desirable results accomplished by this machine are that only one man is required and great physical force is not necessary, so that the job is made more pleasant. It is unnecessary to lift a wheel or tire from the floor since the machine is built to tilt at an angle of 30 deg., allowing the wheel to be threaded on to the stud. An even, steady pressure is exerted on the tire all the way around and there is no possible chance of injury to either the tire or wheel. Five tires can be changed in the time originally taken for one by the old method where tires were removed with a heavy hand hammer and tire tools. The machine is also used for pressing on new tires as well as for removing old ones.



Tire-changing machine used in the garages of the Boston Elevated Railway

*Submitted in Electric Railway Journal Prize Contest.

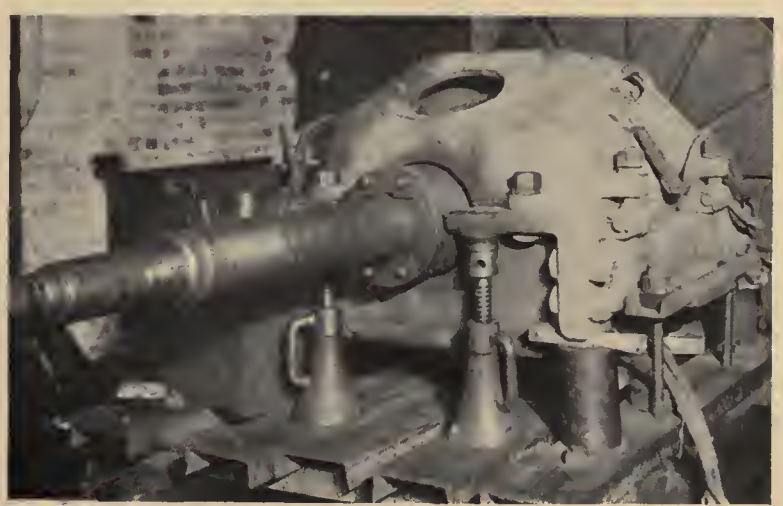
Electric Railway Journal Maintenance Data Sheet

ROLLING STOCK—ELECTRICAL—31

Boring Axle Bearing and Housing Seats in a Wheel Lathe*

By Frank B. Carpenter
Master Mechanic Charleston Interurban Railroad, Charleston, W. Va.

WHEN the bearing fits in the motor frames and housings for armature and axle bearings become worn, it is the practice of the Charleston Interurban Railroad, Charleston, W. Va., to build the fits by welding and bore these out to the original size. This work is done on a wheel lathe by using a few 6-in. channel iron plates and four 8-in. screw jacks to attach and hold the motor shell in position. The boring bar and cutter head are made from an old car axle and a hub of a worn steel wheel.



Set-up for boring out armature bearings in wheel lathe

*Submitted in Electric Railway Journal Prize Contest.

Electric Railway Journal Maintenance Data Sheet

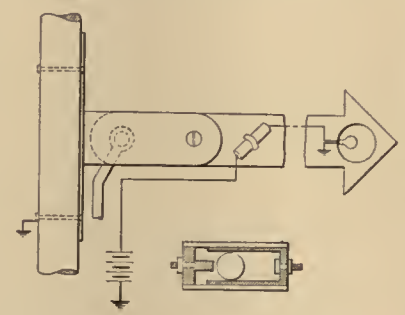
BUSES AND TRUCKS—10

Gravity Switch for Bus-Turn Signal*

By Farrell Tipton
Electrician San Diego Electric Railway, San Diego, Cal.

DUE to the construction of some of the modern passenger buses, it is impossible for the driver to give signals by hand. This makes a mechanical turn signal necessary. The accompanying illustration shows the arrangement used by the San Diego Electric Railway. The signal is controlled through a crank located adjacent to the operator. This is connected to a lever on the outside of the bus which controls the operation of the arm.

The signal arm is made of sheet metal, painted white. A lamp is located at the end of the arm and is inclosed by a red lens at the rear and a green lens at the front. This makes the position of the arm visible at night.



Gravity switch used to control lamps on bus-turn signal

To control the lamp a gravity switch has been devised to open and close the circuit by the action of the signal arm. The switch is made of fiber tube outside with a copper tube inside. Both ends of the switch are sealed. The cap on one end of the tube has a contact post projecting into the center of the sleeve. Electrical connection is made by a ball which is free to roll from one end of the tube to the other. Both ends of the switch are provided with terminals.

When the switch is installed on the signal arm, the switch is inclined at an angle so that with the arm extended the ball rolls into a position completing the lamp circuit from the side of the sleeve to the center contact post. The switch is connected to the positive side of the bus battery, the other side of the lamp and battery being grounded to complete the circuit.

*Submitted in Electric Railway Journal Prize Contest.

Electric Railway Journal Maintenance Data Sheet

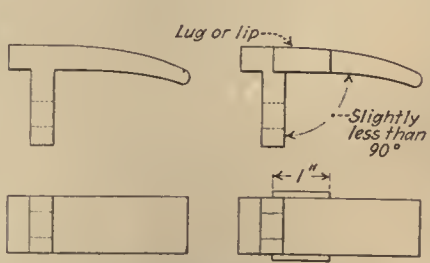
ROLLING STOCK—ELECTRICAL—32

Keeping Line Breaker Arcing Tips Tight*

By A. T. Olsen
Omaha & Council Bluffs Street Railway, Omaha, Neb.

TROUBLE was experienced from DB-987 line breaker arcing tips coming loose in service, which usually resulted in tying up the car. As originally constructed, each tip is held in place by only one cap screw. The tips have a very narrow seat and eventually are loosened by the hammer blows of circuit closing.

To improve this condition, the Omaha & Council Bluffs Street Railway, Omaha, Neb., uses an arcing tip which has a lug or lip on either side. When forced firmly against its seat the hammer blows of the circuit closing do not loosen the tip. Except for these added lips, the arcing tips are identical with the manufacturer's product.



At left, old type of tip. At right, arcing top with lug to prevent loosening

The lips are 1 in. long and are welded onto the manufacturer's tip and filed to fit the seat. In order to insure that the tips seat firmly the part through which the cap screw passes is bent to an angle slightly less than 90 deg. As the cap screw it tightened the tip comes to a firm seat.

*Submitted in Electric Railway Journal Prize Contest.

Electric Railway Journal Maintenance Data Sheet

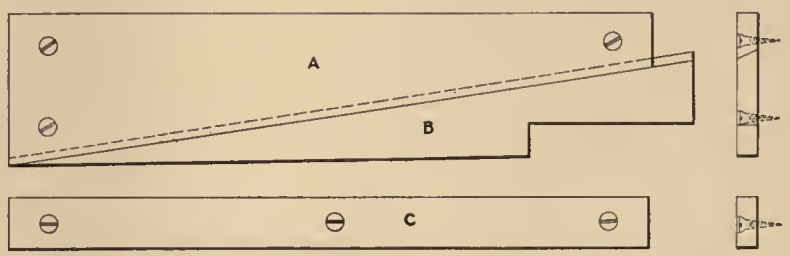
ROLLING STOCK—MACHINE SHOP—6

Convenient Type of Bench Clamp*

By Arthur E. Clegg
Foreman Electrical Department
San Diego Electric Railway, San Diego, Cal.

SAVING of time was the purpose that led to the design of a type of bench clamp used by the San Diego Electric Railway, which is shown in the accompanying illustration. Work can be held in the clamp firmly so that extreme accuracy will result and there is no wasting of time by the work slipping out of the clamp as in some other types.

The sections of the clamp designated as *A* and *C* are held on the end of the bench by means of wood screws. The movable part marked *B* slides along the beveled surface of *A*. The opposite side of *B* is parallel with the side of section *C*. The offset in *B* at the end provides for large objects. Very thin parts can be held by putting thin pieces along the surface of *C* and sliding the movable section *B* on the work, thus clamping it tightly.



Bench clamp as used in the shops of the San Diego Electric Railway

*Submitted in Electric Railway Journal Prize Contest.

Electric Railway Journal Maintenance Data Sheet

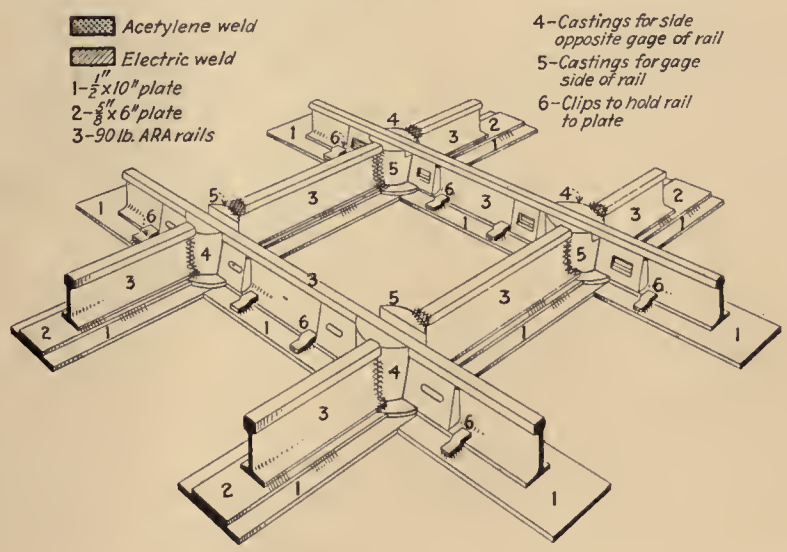
TRACK AND WAY DEPARTMENT—14

Flange Bearing Electric Over Steam Railway Crossing*

By Louis T. Botto
Superintendent Maintenance of Way
San Antonio Public Service Company, San Antonio, Tex.

DURING the past year a special type of electric-steam railway crossing has been developed by the San Antonio Public Service Company. In this, the electric line is flange bearing over the steam line rails. This crossing is fabricated of 90-lb. A.R.A. rails, steel plates and two special steel castings which accommodate any angle between 50 and 90 deg. The framework holds the railroad rails securely to line and gage, but these castings are not bolted or fastened to the rails in any manner.

Since steel plates under the crossing are in the same plane, standard cross ties can be used at right angles to the railroad rails as in standard



*Submitted in Electric Railway Journal Prize Contest.

(OVER)

Electric Railway Journal Maintenance Data Sheet

ROLLING STOCK—MACHINE SHOP—7

Electro-Pneumatic Shear*

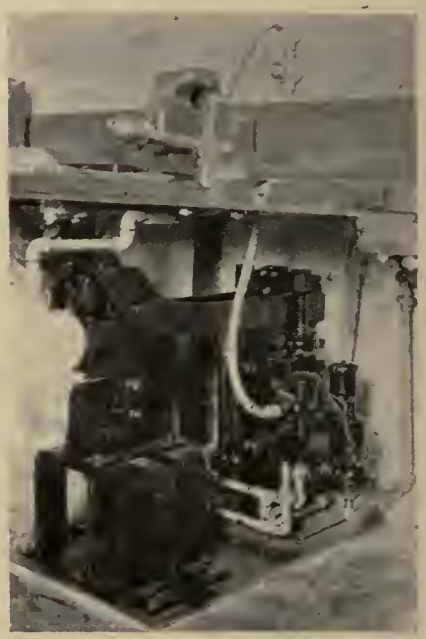
By A. D. Moore

Electrical Department, 69th Street Terminal
Philadelphia Rapid Transit Company,
Philadelphia, Pa.

MANUAL operation of a shear with a capacity of ½-in. x 2-in. flat and ¾-in. round stock has been obviated by changing it for use with an air compressor in the shops of the Philadelphia Rapid Transit Company. A pair of obsolete pneumatic switch movement cylinders were mounted vertically on a bedplate together with the shears. The piston rods are connected with a yoke and power is transmitted from the cylinders to the shear through a lever with a 5 to 1 ratio. The lever consists of two bars with a common fulcrum tied together with a shaft which works in a bushing welded through the body of the shear. The connection between the lever bars and the piston yoke is made by means of a link. The original pin fastening the shear links with the manual lever was replaced by a shaft carrying a roller at each end. The lever bars are slotted and bear on these rollers, thus transmitting power to the shear blade.

Air to the apparatus is controlled by an electro-magnetic signal magnet valve. Directional control is by an electrically controlled National Pneumatic door engine valve which admits air to either end of cylinders.

In operating the shear the circuit is closed to the electro-magnetic valve. With the initial movement of the shears a holding circuit makes it unnecessary to continue to press the starting button. A circuit controller connected by links to the lever reverses a directional valve when the stroke is completed and returns the blade to its normal position. Provision is made to return the blade to its original position at any part of the down stroke as a safety feature.



Electro-pneumatic shear as constructed in the shops of the Philadelphia Rapid Transit Company

As the shear was placed beneath a bench for space economy, a swivel lamp is mounted for illumination.

*Submitted in Electric Railway Journal Prize Contest.

Electric Railway Journal Maintenance Data Sheet

TRACK AND WAY DEPARTMENT—14

Flange Bearing Electric Over Steam Railway Crossing*—Continued

construction, and the steel plates provide better surface bearing on the ties. In paved street intersections where both steam roads and electric lines operate over double track, one set of crossings tends to creep in one direction and the other set in the opposite direction. This often causes a very unsightly and dangerous condition. With the type of crossing illustrated, such conditions do not occur.

In the construction of this crossing the arms of the electric part are perfectly flexible and form a kind of ball and socket joint with the railroad rails, which can be raised or lowered as conditions require. In paved city streets electric railways often are compelled to have crossings over the curves of steam roads, the outside rails of which are superelevated. Where such crossings occur the outside joints of the electric line usually cause an expensive maintenance job. With the type of crossing shown such conditions are accommodated very nicely.



Type of steam-electric crossing used by the San Antonio Public Service Company

During the past year nine of these crossings have been installed by the San Antonio Public Service Company. On an average they have cost much less than the crossings previously purchased and two welders with two helpers are able to fabricate a single crossing in three days.

*Submitted in Electric Railway Journal Prize Contest.

World Wide Recognition!



"Tool Steel" Gears won on actual comparative service tests

The increasing volume of "Tool Steel" Gears specified during the past 7 years bears out the results of tests made.

In the last 7 years $800,000.00 worth of "Tool Steel" gears and pinions have been specified and bought for new street railway and electrification equipment in North and South America, England, Holland and Australia.

Specify "Tool Steel" gears for your new equipment.

The Tool Steel Gear & Pinion Co.

Cincinnati, Ohio





REDUCE ROAD FAILURES

Road failures to a considerable degree are motor insulation failures.

These failures are greatly reduced by periodic renewals of the insulating varnish, which protects the car motor armature.

The renewal process requires but little time and no trouble when the maintenance shop is equipped with a specially designed insulation baking oven.

Armature baking is the best way to decrease road failures.

YOUNG BROTHERS COMPANY
6520 MACK AVENUE, DETROIT, MICHIGAN

DISTRICT SALES OFFICES

30 Church St. - - - - New York
1424 Guarantee Title Bldg., Cleveland
412 Granite Bldg. - - - - St. Louis
419 Call Bldg. - - - San Francisco
988 Ellicott Square - - - - Buffalo
20 E. Jackson Blvd. - - - Chicago
807 San Fernandn Bldg., Los Angeles
248 Central Bldg. - Seattle, Wash.
10 High St. - - - - Boston, Mass.

OVENS FOR

Core and mold baking — Low temperature heat treating — Drying, Japanning and Enamelling—Electrical appliance baking —Adapted to all methods of heating.

YOUNG BROS. CO. OVENS — OUR BOLTLESS JOINT — DETROIT

INDUSTRIAL OVENS

TRIBLOC CHAIN HOISTS



For the overhead tracks in your shop



To make a profit by "meeting the demand for better transportation," it is essential that you have "better transportation" *in the shop.* Ford Tribloc Chain Hoists provide this "better transportation"—a lively and profitable load hoisting and moving service.

Let us tell you why the MALLEABLE IRON and FORGED STEEL parts used in the construction of Ford Triblocs mean better, longer-lived hoists.

Send for Catalog 7-B

FORD CHAIN BLOCK COMPANY
2nd and Diamond Sts., Philadelphia, Pa.
2380-D

"American"



Light and Heavy SPRINGS

Advantageous location for prompt delivery of raw materials—Ample equipment of modern automatic machinery and appliances — Pyrometer equipped furnaces assuring accurate, uniform heat treatment and over 35 years' spring manufacturing experience constitute a service which means satisfaction.

May we estimate on your needs?

AMERICAN SPIRAL SPRING & MFG. CO.
Established 1887
ARSENAL STATION
PITTSBURGH, PA.,
U. S. A.

Electric Railway Journal Maintenance Data Sheet

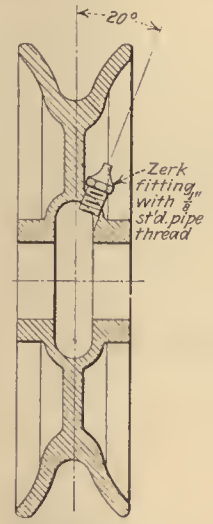
ROLLING STOCK—MISCELLANEOUS—18

Grease Fittings Applied to Trolley Wheels*

By Charlie Herms
General Foreman San Diego Electric Railway, San Diego, Cal.

TROLLEY wheels lubricated by Zerk grease fittings are used by the San Diego Electric Railway. Wheels are ordered with a hole drilled and tapped for ⅛-in. standard pipe at such an angle as to permit the use of a Zerk grease gun nozzle. For a 6-in. diameter wheel an angle of 20 deg. is required to permit the placing of the gun nozzle between the harp and the flange of the wheel.

This method of lubrication shows that there is less bushing and pin renewals and less time is required on inspection for lubrication of trolley wheels than with methods previously used. The life of the trolley wheel itself is also increased as fewer wheels develop flat spots that are usually caused by sliding on account of poor lubrication. Zerk fittings are removed from old wheels and reinstalled in new ones.



Application of a Zerk fitting to 6-in. trolley wheel

With this method of lubrication the chamber of the trolley wheel is kept filled with grease and a wheel can make a 500-mile run without danger of running dry. Another advantage of the Zerk fitting over the old method is that grease or oil is not spattered over the ends of cars. Previously inspectors did not have a proper method of applying the lubricant and a considerable amount would be dropped on the cars and cause a bad appearance.

*Submitted in Electric Railway Journal Prize Contest.

Electric Railway Journal Maintenance Data Sheet

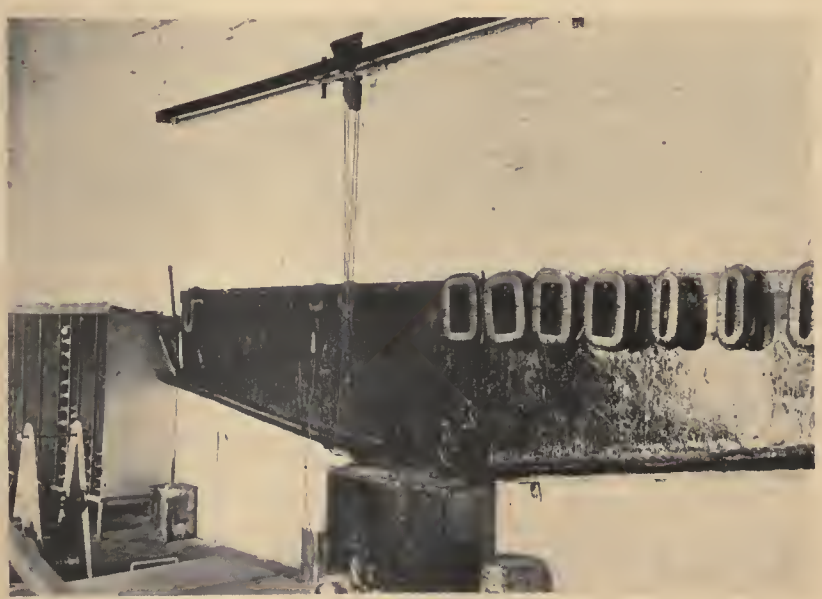
ROLLING STOCK—ELECTRICAL—33

Dipping and Draining System for Field Coils*

By Equipment Department
Georgia Power Company

REINSULATION of field coils with the system used by the Georgia Power Company requires dipping in plastic varnish before and after the canvas webbing is put on and dipping in finishing varnish to provide a smooth, glossy finish after the last baking. Convenient equipment is provided for the dipping and baking in the form of a sheet metal trough 20 ft. long fastened to the shop wall. The trough is divided into two sections of equal length, each draining toward the center and emptying into different vats. One side is used for black plastic varnish and the other for air-drying finishing varnish. By dividing the trough the two operations can be taken care of without mixing the fluids.

Supports are provided for the field coils in the form of pegs welded



Dipping and draining board used by the Georgia Power Company in the Atlanta railway shop

*bmitted in Electric Railway Journal Prize Contest.

(OVER)

Electric Railway Journal Maintenance Data Sheet

ROLLING STOCK—MISCELLANEOUS—19

Modernizing Headlights*

By R. T. Chiles
Master Mechanic Cumberland County Power & Light Company, Portland, Me.

IN ORDER to bring our headlight equipment to a higher degree of efficiency we were confronted with the alternative of junking 50 Imperial headlights and rewiring cars for use of a more modern type or the reconstructing of the present headlights. As the cost of new equipment and wiring changes would have been about $60 per car, it was decided to modernize the present headlights so as to use standard 150 or 95-watt concentrated filament lamps and a glass reflector with focusing arrangement.



Construction used for modernizing headlights

This was accomplished without changes to the car wiring, as in addition to the 210 ohms in the old headlight resistance we added 295 ohms in the circuit. This provided 60 volts for the dim stage, and by tapping the resistance in the headlight circuit at the 160-ohm point 115 volts was provided for the bright stage. The two resistance tubes in the headlight are mounted on the original bracket and, for the 150-watt lamps, are wound with No. 24 resistance wire.

For headlights using 94-watt lamps a resistance of 611 ohms was added in the headlight in addition to the old resistance for the dim stage to provide 60 volts and a tap was brought out to give 300 ohms and provide 115 volts for the bright stage. No. 29 resistance wire was used. Other material used to modernize the headlights included 12-in. glass reflectors, new sockets and a small amount of resistance wire. The labor cost was about $16 per headlight.

Submitted in Electric Railway Journal, Prize Contest

Electric Railway Journal Maintenance Data Sheet

ROLLING STOCK—ELECTRICAL—33

Dipping and Draining System for Field Coils*—Continued

into a piece of ⅝-in. x 3-in. steel which is fastened to the wall along the top edge of the back of the trough. The pegs are spaced 12 in. apart and with fields in position there is 1 in. clearance between them.

For convenient handling a small traveling hoist with a brake above the trough is arranged so that the lifting hook will remain in any position until the brake is released. One man can lift a field coil with the hoist and move it along the trough without danger of dropping it.

This system replaces one which required two men to handle coils from the dipping vat to the drain board. The old system required a floor space 8 ft. square. The new equipment is 20 ft. long, projects 18 in. from the wall and uses less than one-half the floor space of the previous equipment. It also presents a much neater appearance.

Submitted in Electric Railway Journal Prize Contest.

New Equipment Available

Light-Weight 75-Ton Jack

EXTENDING its line of oil power jacks, a 75-ton model hydraulic jack has been brought out by the Blackhawk Manufacturing Company, Milwaukee, Wis. This new model weighs but 200 lb. and is lighter than jacks of other design of similar capacity. It has special carrying handles so that two men can carry it with little effort.

The collapsed height of the new jack is but 18 in. and is low enough to go under most jobs. It has a 10-in. lift, which gives a total height of 28 in. There are two pumps, a speed pump to raise the plunger of



New 75-ton hydraulic jack

the jack to the point of contact and a power pump to raise the load.

The load is lowered automatically, fast or slow as desired, and is under control at all times. It can be raised or lowered in fractions of an inch, as desired. A release valve entirely separate from the pump prevents accidental lowering. All working parts are built on the outside of the jack.

An outstanding feature is the check valve unit. This contains both ball checks and is the heart of the jack. The twin check unit can be removed easily for cleaning by simply unscrewing the pump, without tearing down the jack. The capacity of the jack is rated conservatively, safety being the first consideration. Each jack is tested beyond rated capacity at the factory.

Dick Prescott Talks Colors

And Steve Sees the Light



DICK PRESCOTT, assistant superintendent of the Consolidated Railway & Light Company shop, had taken Steve White, carpenter shop foreman, out into the shop to look over one of their most modern cars. Steve did not know what Dick had in mind, and so he looked expectantly when they paused before a car.

"Steve," said Dick, as he pointed toward the Consolidated's latest type of rolling stock, "look at that car and tell me whether you would paint your automobile that way."

"I don't get you, Dick," replied Steve, regarding his superior in mild surprise.

"Sure you do, Steve. Would you paint the doors of your automobile a different color than the body, or would you slap a solid color of green or yellow or orange all over your automobile body and let it go at that?"

"Why, of course not."

"Then why in the world do we do that on a street car?"

"Well, a street car's a different proposition."

"Why, Steve?"

"Oh, I don't know, Dick. I don't quite get you yet. We've always painted cars that way."

"That's exactly what I'm driving at. We started painting cars that way long before the automobile came along, when people had to ride with us or walk, and we've never given a thought to doing anything else."

"What have you got in mind, Dick? Goin' to put on a lot of these circus colors we've been reading about?"

"Not at all."

"Then I don't quite follow you."

"Listen here a minute, Steve. It's amusing to hear some of the serious discussion of this circus painting by people who don't understand what it's all about. Some of the properties that have put on bright colors with pennants and other decorations have done that merely to attract attention to the fact that there's a street car system in town. That's merely a passing phase in the effort to develop more attractive color combinations for cars, and painting schemes that will improve their appearance instead of making them look awkward and clumsy."

"That sounds all right, Dick, but what do you propose doing?"

"I think we ought to get away from that solid yellow we've had on these cars for fifteen years. Let's use one of the automobile man's bag of tricks that we see paraded before our eyes every day and that he uses effectively every time he brings out a new model. We could pick out a decent combination of two colors that blend well together and put a nice band or stripe between them so we could carry the colors all the way around the car."

"Do you mean that you'd paint right across the doors instead of keeping them finished in mahogany?"

"Sure."

"Well, I never saw that tried. Still I can't see but what it would look all right."

"There's only one way to find out how to do it, Steve, and that's to try it out. Let's take this car as a sample and see what we can do."

"That is easy, Dick. I'll bring some color panels up to your office tomorrow, and you can decide on the color scheme you want to try out."

"Good enough. We may have to try two or three combinations before we work it out, but I'm anxious to see whether Mr. Milburn, our general manager, isn't ready to spend a little money on paint to make these cars look a little less like box cars going down the street."

Association Activities

New England Club Has Record Meeting

History of the Connecticut Company was outlined and New Bridgeport mercury-arc rectifier substation discussed before large gathering at Hartford

IN ACCORDANCE with its recently adopted policy of holding meetings in the various cities served by the larger operating companies in that section the New England Street Railway Club met on Dec. 8 at Hartford, Conn. The program was arranged by N. J. Scott, manager of the Hartford division of the Connecticut Company, and centered around the activities of that railway. About 200 members were present. This large attendance was said to establish a record for a regular quarterly meeting of the club.

Charles Rufus Harte, construction engineer of the Connecticut Company, presented an interesting outline of the 68 years history of his company and its predecessors serving the same territory. His talk was illustrated by lantern slides showing both the early days of the railway's history and the scope and character of its present transportation system. An abstract of his address appears elsewhere in this issue.

Rectifiers Supply Bridgeport

Mercury-arc rectifiers at the new Bridgeport substation were discussed by George Wood, power engineer the Connecticut Company. Early in the fall of 1926 studies had been commenced, he said, with a view to the creation of modern power facilities for the company at Bridgeport. The company's Seaview Avenue generating station was old and costly to operate. Its location was remote from the center of the load and there were considerable losses in the feeder lines. Another influential factor in favor of change of the source of power was the impending necessity to spend $60,000 for a new submarine cable crossing where the city was planning to relocate an important highway bridge. These studies indicated that the power demand of the railway could be met most satisfactorily by the erection of one substation in the vicinity of the Congress Street carhouse in the city of Bridgeport and a second in the town of Stratford.

Mercury-arc rectifiers were chosen for these substations for four reasons: (1) Efficiency; (2) ability to operate on either 25 or 60 cycles; (3) low maintenance cost; (4) freedom from heavy foundation requirements. The latter consideration was of great importance because the station is located on filled land. Accordingly seven 2,000-amp., 600-volt mercury-arc rectifiers were bought from the American Brown Boveri Corporation. The Congress Street substation, which carries the bulk of the load, is equipped with five rectifiers. It is manually operated. The Stratford substation has two rectifiers and is wholly automatic. For convenience and simplicity it was decided that all units at both stations should be of the same design.

Mr. Wood presented lantern slides showing the outdoor equipment, including the two incoming three-phase, 13,900-volt transmission lines, the auxiliary bus on each line ahead of the switches, the auto-transformers and the main 1,400-kva. transformers. These are designed to operate with three-phase primary at 6,600, 11,000 or 13,900 volts, while the secondary is double six-phase at 550 volts.

Other views were presented showing the interior equipment and arrangement of the station. The rectifier and feeder control board consists of twenty panels. At one end is the incoming line and auxiliary control panel. Next come five rectifier control panels with meters and protective apparatus. At the other end of the board are fourteen panels for feeder switches and circuit breakers.

Construction of the building was commenced March 27 of the present year, Mr. Wood said. Work on the equipment began May 15. The first unit was put in operation Aug. 15 and all were in operation by Sept. 26. No trouble of any kind has been experienced since these rectifiers have been in service and an over-all efficiency of 93 per cent has been obtained, including the line loss. A technical article concerning this installation will appear in a future issue.

The discussion was continued by John Egli, field engineer American Brown Boveri Corporation. He said that the reason for installing auto-transformers was to permit the station to operate at a greater variety of voltages than could be secured satisfactorily with ordinary transformers. He called attention to the fact that more than 800 mercury-arc rectifiers have been made by the Brown-Boveri company at Baden, Switzerland, and that street railway systems at Berlin, Germany, have placed orders for additional equipment.

Robert B. Stearns, president of the club, presided at the dinner and evening meeting. He paid tribute to the excellent work done by the officials of the Connecticut Company in arranging the meeting. J. K. Punderford, president of the company, said that the major part of the credit belonged to N. J. Scott, manager of the Hartford division. The latter spoke briefly and said that it had been a pleasure for the Connecticut men at Hartford to do what they could in arranging the program and making the meeting a success.

Transportation problems were touched upon briefly at the end of a talk by Richard T. Higgins, chairman Connecticut Public Utilities Commission. Mr. Higgins began his talk by mentioning the annual meeting of the National Association of Railroad and Utilities Commissioners held some time ago at Dallas, Tex. From this he went on to speak of industrial conditions in the South. Reverting to the subject of transportation, he said that the public will co-operate if informed of utility activities. Good service and courtesy, however, are essential to securing this co-operation. In Connecticut the commission's inspections showed the bus service rendered by the Connecticut Company to be the best in the state. This, he said, is primarily because it has trained men. He prophesied an increasing use of public transportation vehicles because congestion is causing people to keep their private automobiles at home. Nothing has yet been invented, he said, which equals the street car for efficient handling of mass transportation.

COMING MEETINGS OF *Electric Railway and Allied Associations*

Jan. 6—**Metropolitan Section, A. E. R. A., Engineering Societies Building, 39 W. 39th Street, New York, N. Y., 8 p.m.**

Jan. 16-17—**Midwest Electric Railway Association, Hot Springs, Ark.**

Jan. 18-19—**Kentucky Association of Public Utilities, annual meeting Brown Hotel, Louisville, Ky.**

Jan. 18-19—**Central Electric Traffic Association, Hotel Gibson, Cincinnati, Ohio.**

Jan. 25—**Central Electric Railway Master Mechanics' Association, Hotel Gibson, Cincinnati, Ohio.**

Jan. 25-27—**Electric Railway Association of Equipment Men, Southern Properties, Roosevelt Hotel, New Orleans, La.**

Jan. 26-27—**Central Electric Railway Association, Hotel Gibson, Cincinnati, Ohio.**

Jan. 31—**New York Electric Railway Association, annual meeting, Hotel Commodore, New York, N. Y.**





At left—Old Fair Haven, Broadway & Westville horse car. At right—the wooden bridge over the Connecticut River at Hartford. It was built in 1818 and made free in 1889. On May 17, 1895, the bridge burned

68 Years of Railway Service in Connecticut*

By Charles Rufus Harte
Construction Engineer the Connecticut Company, New Haven, Conn.

HISTORICALLY, the Connecticut Company dates from June 18, 1859, when its oldest line, the Hartford & Wethersfield Horse Railway, received its charter. Other lines followed from time to time until 1888. When electric operation began, there was a very considerable mileage throughout the state.

The New York, New Haven & Hartford Railroad made its first purchase of trolley stock, a controlling interest in the Stamford Railway, in 1895, but the principal growth followed the purchase, in 1902, of the Worcester & Connecticut Eastern, which under its new name of the Consolidated Railway, by purchase, construction and lease in the period ended June 1, 1907, created practically the present property, which on that date was put into the hands of the Connecticut Company, chartered for that purpose, to be operated by it. In 1910 the title to the property formally passed to this company.

In 1914, in connection with settlement of difficulties with the United States government, the Connecticut Company was placed in the hands of five federal trustees, appointed by the court, a situation which continued until Jan. 1, 1926, when the decree was dissolved and the property was returned to the New Haven Railroad.

The system consists today of 514 miles of first main track, 185 of which is double, and 196 miles of bus routes, over which are operated some 1,323 passenger cars and 124 buses. These carried in the twelve months ending Oct. 31, 1927, the equivalent of 151,030,148 single fare, and 29,334,383 transfer passengers by cars, and 13,334,383 single fare and 1,821,545 transfer passengers by bus, the necessary power for the cars being in part generated by the three owned stations at New Haven, Hartford and Danielson, and in part purchased.

It was the thought of the late president of the New Haven system, Charles S. Mellen, that the way to make a railroad prosperous was to insure the prosperity of its territory, and he believed that good secondary transportation would bring that prosperity, resulting in a net gain if both groups were under the same control, although the secondary group by itself might actually be a losing proposition. The difficulties of the New Haven and the astounding increase in automobile use completely upset Mr. Mellen's calculations, but any criticism of the unfortunate outcome of some of the plans, to be just, must consider the purpose in view, and the totally unexpected development of later years.

The track structure today does not include any of the old strap rail on longitudinal stringers, nor some of the very light sections on metal chains, but while in replacement general standardization is going on there is still a large variety, partly hand-me-downs from old companies, but still having good service life, partly as the result of experimental work and partly due to special conditions. Today we have three general forms, open steam railroad type on private way, paved on wooden ties in the majority of the cities, and here in Hartford, where clay makes a great deal of trouble, paved on steel-and-concrete twin ties on a concrete mat with upturned edges, forming a trough.

These ties are precast, the increased weight making it far easier to line and surface the 134-lb. rail under which they are used, while their shorter length and less depth than wood ties effect a saving in the expensive mat construction that offsets the higher first cost. Joints are welded, using chiefly the arc, although there have been quite a few thermit welds. General maintenance costs have been steadily reduced by the employment as far as practicable, of the modern mechanical aids, ranging from cranes and steam shovels down to tamping tools and similar compressed air apparatus. It may be of interest to note that Con-

*Abstract of a paper presented at a meeting of the New England Street Railway Club at Hartford, Conn., Dec. 8.





At left—Official trip of the first electric car in Hartford, on Sept. 12, 1888. At right—A modern car and bus of the present-day Connecticut Company



An early model of car for the Hartford & Wethersfield Horse Railway



This car was placed in service in Hartford during 1890

necticut, recognizing the injustice of today requiring the trolley to pave a large proportion of the street for the use of its competitors, has cut down the paving requirement for the old one of all between lines two feet outside the outside rails, to eight inches each side of each rail.

The early motive power was that of the good old "hay burner," not unduly speedy, but reasonably dependable if conditions were not too adverse. The old track and the small flanges made a combination easily broken up, and it was regular procedure to turn the team to one side, drag the car off the rail, around some obstacle and back on to the track, which was apt to be pretty nearly as rough riding as the cobble paving.

The advantage of a different type of motor was early realized, however. In 1873 New Haven tried a compressed air motor which went out Whitney Avenue quite successfully, but came to grief in returning. A number of the properties were deeply interested in the developments in electrification, so much so that while the first successful commercial line, the Sprague system at Richmond, Va., began operation in February, 1888, Connecticut had three electrified systems in operation within eight months.

At Derby, a Van Depoele system started operation on May 1, 1888. The little cars had the motor on the front platform with chain-and-sprocket drive to the axle, and the collector was an underrunning wheel. James Kennedy, now roadmaster of the Derby division, had much to do with the installation and claims to have invented the first overhead frog. His description of how he made the pattern from the heavy pasteboard of the box which held his wife's wedding dress, and of the lady's reaction when she discovered it, is certainly convincing.



A Daft car at Meriden, using an over-running collector

On July 1, 1888, Derby put in operation a Van Depoele freight locomotive, and while in the earlier experiments electric locomotives had been used to draw passenger trailers, so far as is known this was the first use of an electric locomotive for freight service in the world.

In Meriden, two months later, there was started a Daft system, using the overrunning collector, a real trolley, which gave the electric car its usual name. The two sides of the circuit formed the track for the collector, from which a flexible cable dropped to the car where it was so fastened that it could readily be disconnected. There were but the two wires overhead, and at sidings, while the cars passed, the trolleys were exchanged. The device proved a bad actor, however, readily running off its wire track, smashing in the roof of the car when, as was usually the case, it landed there.

Hartford had been the first city in the state to have horse cars, and while it was a little slow in trying the new electric cars it was not very far behind Derby and Meriden, its Sprague system having a tryout on Sept. 12, 1888. The car looked more like a present-day trolley than the two others, and it worked well, but it was some time before all the city lines were electrified. During this period, about 1890, there was tried a Barrett storage battery car, made in Springfield, which ran for some time with varying success on Main Street.

New Haven held to the horse car even longer than Hartford. The first line electrified was that to West Haven, the first electric operation being the night of June 13, 1892; the last line the Dixwell Avenue, was electrified three years later.

Appreciating the possibilities of the bus, this company early gave the question careful study, but it was not until the Legislature of 1921 gave some measure of protection that regular operation was tried. Today we have a fleet of 124, furnishing transportation in those cases where there is a real necessity, but not enough to warrant construction of a car line; where highway changes required track reconstruction at cost which was not warranted by the traffic; and in a few instances where it has been possible by the use of the bus to give express service, notably in the case of the New Haven-Bridgeport line.



Snowbound. One of the experiences in the operation of the West Chapel Street line in New Haven



Van Depoele electric locomotive at Derby

British Institute President Shows Economy of Electrification

R. T. SMITH, the new president of the British Institute of Transport, in his opening address delivered in London recently spoke on "The Advantages of Main-Line Railway Electrification." He drew attention to the results of six years' operation of the electrified portions of the Swiss Federal Railways. President Smith said that the time of the journeys made by express trains has been decreased 20 per cent and slower passenger services have been improved. Heavier freight trains are being hauled than was possible with steam locomotives, the average increase in trailing load up to last August being 47 per cent. The capacity of the Gothard line for carrying minerals has been doubled.

Electrification has not increased the cost of the permanent way. Together with the fall in the cost of wages, it has reduced the total cost of traction and of workshops, and has enabled 34 per cent more traffic in ton-miles to be hauled by the whole railway equipment, steam and electric, in the last four years without any appreciable increase in the traffic cost of working the trains and the stations.

Relative to English and Welsh railways, Mr. Smith said that the individual headings of expense in the working cost of the train-mile since the war average three times the pre-war cost, but will probably sink to double pre-war cost. Estimates for main-line electrification projects in Britain over long lengths of route show that the savings in working expenditure as compared with steam will pay on the cost of electrification from 5 per cent on fairly busy lines to as much as 12 per cent on lines fully worked with dense mineral and freight traffic throughout the 24 hours. The capital cost per route-mile of double track, estimated at £25,000 ($125,000) for suburban lines, will probably amount to £60,000 ($300,000) for main lines.

English and Swiss figures are not comparable, as English equipment is for density of traffic between two and three times as great as Swiss traffic. Speaking as an engineer, one-half of whose career has been spent in the railway service, President Smith said that perhaps some of his old railway colleagues would be stimulated to look at railway electrification not only from the point of view of saving working costs—although this can be done under favorable conditions—but that of increasing the earning power of a certain investment in way and works through increasing the average speed of freight train and slow train operation.

Co-ordinating All Transportation Facilities Under One Management*

By J. M. Shaw
Executive Secretary Mitten Management, Inc.

IT HAS come to be recognized in modern business that mankind withholds its greatest rewards for those who serve it best. It is the recognition of this truth which has changed completely in two short decades the public attitude toward "big business." The modern trend is all toward consolidation of related industries and industrial units. We gaze with mute approval at consolidations and mergers which fifteen years ago would have made us rush wild-eyed from the market place determined to pass a law.

We have seen the trend toward consolidation in our own industry and it is universally agreed that we need more of it. The problem facing our largest cities is how to bring it about fully and completely and in fairness to all.

The street car is now and is likely to continue to be the backbone of transportation in large cities. The motor bus has found a place of increasing usefulness in supplying boulevard service and in serving feeder lines in outlying sections, as well as in communities where the large initial investment in track and overhead is not justified. High-speed lines under and over the ground have contributed much in densely populated cities. The private automobile has won the hearts of many who formerly use public transportation. All of these facilities, however, have limitations which prevent them from replacing the street car.

Mitten Management, which operates the city transportation systems of Philadelphia and Buffalo, has arrived at the conclusion that every phase of city transportation must be brought under one direct operating control before this universal problem can be properly approached. By this means street space may be conserved. At the same time, the largest possible proportion of transportation earnings may be made available for expansion and improvement.

This principle has been applied in Philadelphia to a greater extent than in any other large city. The street railway lines have for many years been operated as a unit by the Philadelphia Rapid Transit Company, the numerous companies of earlier days having been brought together by the economic pressure of the need for a one-fare city-wide system. To this surface system have also been added the Market Street subway-elevated line, built by the company, and the Frankford elevated line, built by the city.

The development of the motor bus, because of the urge to "ride on rubber" and in view of the advance in the automotive art, was inevitable. We were confronted with the problem of meeting a new form of competition with the street railway lines. Decidedly the best way to meet this competition would be to use the resources of the existing system to develop a bus service which no competitor could hope to equal. Since 1923 we have steadily added to our bus equipment and are now operating buses over 200 miles of city streets at a 10-cent fare, assuming a seat for every passenger, and giving a connecting ride with street car and subway-elevated lines for 3 cents additional.

Even the motor bus, however, does not entirely meet the public desire for greater speed and comfort, and the taxicab in recent years has become increasingly a factor of competition with the existing facilities. P.R.T. accordingly purchased the Yellow Cab Company, the largest cab operator in Philadelphia, and has announced its intention of ultimately combining as part of its system all the taxicabs of the city. When this is accomplished, it will make possible the furnishing of a higher grade of service, with elimination of unnecessary cruising in the city streets and other economies.

The Philadelphia taxicab companies have submitted to the Public Service Commission a plan for the elimination of cruising. Under this plan the two smaller companies will be merged with P. R. T., leaving only two companies in the field. These will co-operate in the no-cruising plan. The cabs will thus operate so as to increase their own usefulness and at the same time give due consideration to the economical use of the street space in the interest of the great majority.

Not only does this co-ordination wipe out the wastes of competition and make for better transportation service, but it has the added advantage of keeping together in one fund the earnings of the joint system, so that as little as possible may be dissipated and the greatest possible share applied to help support new facilities supplied either by the company or by the city.

This entire transportation problem is vital to the future of every American city, and the one which solves it best will have a great commercial advantage over its less progressive neighbors.

From the standpoint of the private operator, there must be a readiness to submit to the process which transforms him from a street railway man, a bus man or a taxicab man to a purveyor of transportation. He must understand that, although his business has thus been co-ordinated with others, he is subject to more violent competition than ever before because of the development of the private automobile. He will be wise if he has his ear to the ground to recognize changes in the public taste, and by supplying every need win that measure of public good will which is priceless and the importance of which we have in the past been inclined to minimize. Our slogan for the future should be "Co-ordinate or bust."

**Abstract of a paper presented at the annual convention of the Pennsylvania Street Railway Association, held at Scranton, Pa., Dec. 1 and 2.*

Better Organized Supervision*

By W. T. Rossell
General Manager Pittsburgh Railways

TO ORGANIZE is by definition to bring into systematic relation as parts of a whole. Electric railway properties are organized to produce local mass transportation of the best quality consistent with a low fare and a reasonable profit. Organization connotes supervision. A lone craftsman or artist, fashioning a completed article, needs no outside supervision. He is a complete organization in himself. At first, men were individualists, each supplying his own needs. The family and the tribe were the first steps in specialization. The history of civilization is the history of specialization.

To be successful, an organization must perform its functions well as measured by the standards of the day. It must also have the power to adjust and to adapt itself to changed conditions. Nothing is surer or more ruthless than change. Its victims strew the records of the past and are everywhere today. They include every kind of organization, from individuals to empires. So the value of an organization may be measured by the two qualities efficiency and adaptability. They are not synonymous, indeed they may be mutually exclusive.

Industry developed as men gradually discovered that by gathering in organizations they could produce and consequently have more. It was discovered that tools could be used to advantage; that one man could do one part of the work and others different parts. Some came to supply the materials; others to fabricate them.

These methods grew slowly, painfully, and often in a haphazard way. It was at times discovered that materials moved back and forth many times before the work was completed. Men frequently spent more time walking about than they did at work.

It must be obvious to all that as specialization increases the interdependence of individuals and groups grows. Some one fails and another finds himself without the proper tools or materials. His failure in turn reacts on others and the whole organization is affected. Whether the organization be a shop, a department or an entire street railway company, the better it is organized the greater the specialization.

Here is often a weakness of large organizations. They become unwieldy, there is a lack of co-ordination between the parts. This may develop into misunderstanding and even jealousy or hostility. This is by no means an uncommon condition in industry. We all have seen it. Here is the rôle of supervision. Its part is to clear the path; to study the problems; to bring out the facts.

The work as a whole must be coordinated and information must be disseminated throughout the organization. Obstacles must be removed, emergencies must be foreseen and plans must be formulated. In general, supervision performs the same functions for industry that the brain and nervous system do for the human being. The careful organization of supervision is nothing but the logical carrying further the idea of specialization.

"Organize, Deputize, Supervise"

When this is understood the further division of duties is simplified. In general, supervision divides itself naturally into three parts, which must be present whatever the size, organization, or type of work. The first includes research, planning, emergency and other things which do not come under the head of regular routine.

The second includes supplies, records and other matters that might be called auxiliary routine. The third includes the supervision of operations, the daily routine of the organizations. Each of these parts may comprise a considerable organization or they may all be included within one man; the natural division still remains.

There is often a tendency to have too little supervision. Its value is at times intangible and retrenchment is easily made by cutting the supervisory force. In a well-trained organization the loss may not at first be felt. Later, the organization may show a let-down, both in efficiency and in adaptability.

It is difficult to know the right organization. The only true measure we have is economic, and complete analysis is difficult. If we can lay our natural prejudices aside, and, over a considerable period of time, note a steady, uninterrupted, forward progress it is reasonable to believe that our supervision is well organized. This is especially true inasmuch as overmanning is almost as hurtful as undermanning. Someone has given as a formula for management: "Organize, deputize, supervise." To state it better would be difficult.

**Abstract of a paper presented at the annual convention of the Pennsylvania Street Railway Association held at Scranton, Pa., Dec. 1 and 2.*

Unselfish Co-operation Needed to Solve Traffic Problem*

By R. C. Haldeman
President Pennsylvania Motor Federation

NO ONE has yet, nor in my opinion will any one for some time, bring forth a complete solution of the present-day traffic problem. Many excellent ideas have been proposed and, conversely, many that are not worth the ink necessary to put them on paper. This will always be, so long as human nature is such that it views things from the individual standpoint and not strictly for the advantage of the greatest number.

The present-day habit of using our streets as a public garage is one of the greatest evils tending to increase congestion in the business districts of our municipalities. It is both a selfish and a time-wasting habit of the motor car owner. The individual apparently gives no thought to the inconvience that his action places on the many. It is a simple mathematical proposition to determine how many automobiles can be parked in one block. It is also comparatively simple to count the flow of vehicles through that block. Statistics show that the number of flowing vehicles overbalances those parked in the ratio of more than 7,000 to one. Need anything more be said on the question of selfishness?

But if the individual still insists on being selfish, let him consider the time that he is wasting. It averages at least ten minutes to get the car out of a garage in the morning. If it has been parked all night on the street, especially over a cold winter night, the time of starting is probably longer. He drives down town with his mind set on a particularly convenient locality in which to leave his car. At least 99 times out of 100 he finds that place occupied by an earlier riser, and he spends ten minutes more looking for some other niche. It is probably three or four blocks from his office or wherever he desires to transact his business. Another ten minutes lost. Figure out what this selfishness is costing in time per day, week, month or year. Life is too short to throw away all this time to satisfy a purely selfish whim.

Another thing that is helping to congest our streets and highways is the present-day indiscriminate use of the automatic traffic signals. The best method of handling traffic is to get it quickly out of the way, and this the automatic light surely does not accomplish. On the other hand, in the majority of cases, the automatic light causes periodic congestion and thereby creates a useless hazard. We are not arguing against the traffic light, but only against its automatic feature. Wherever there is need of protection, there is also the need of an officer, in whose hands should be placed the operation of the light. In our opinion, neither an officer nor his assisting light should be placed at any point before there has been a thorough, scientific study of the traffic flow at that point. The argument has been made that no municipality can afford the expense of placing traffic officers at all the necessary locations. In the first place, such an argument is inherently wrong in that

**Abstract of a paper presented at the annual convention of the Pennsylvania Street Railway Association, held at Scranton, Pa., Dec. 1 and 2.*

every expense is justified that either tends to protect or save a human life, and in addition the proper kind of a traffic flow survey would probably disabuse their minds as to the necessity of such protection. Too many times many of our municipalities have been influenced by the suggestions of those who have formed a snap judgment of the wildest kind.

And now I come to the only real solution of the traffic problem. Two words express the idea, and those words are "unselfish co-operation." Nothing is ever accomplished in this world except by the co-operation of those interested. Surely we are both vitally interested in the lessening of congestion. You are avowedly public carriers. Each operator of a motor vehicle is a potential carrier. We both use the streets and highways—you through the privilege granted by your charter, and we motorists by reason of our citizenship. In time lost, in damage caused and in every conceivable way, we are both—your organization and the one which I represent—vitally affected. Let us both co-operate to the fullest extent in the attempt to better these conditions, which affect us both so vitally.

American Association News

Subjects for Engineering Committees

SUBJECTS have now been assigned to all of the committees of the Engineering Association, as announced briefly in this paper for last week. The report of the committee on subjects, giving these assignments, is given below:

Power Division

Special Committee No. 1—Review existing Manual sections of both power generation and conversion and power transmission and distribution; except Section D 200-26, covering specifications for electrical conduit construction, and Sections G 200-15 and G 201-21, which are assigned to special committees.

Special Committee No. 2—Continue the study of design and operation of mercury-arc rectifiers and mercury-arc rectifier stations, including standard specifications, particularly as to rating.

Special Committee No. 3—(a) Secure and compile information on power contracts and power costs, for confidential use at association headquarters, and (b) check detail of contracts obtained with Manual Sections G 200-15 and G 201-21 and determine whether any revision of these Manual sections is desirable.

Special Committee No. 4—Study desirability of the separation of current carrying apparatus and the control equipment in switchboard layouts.

Special Committee No. 5—Continue the subject of specifications for materials and construction for catenary trolley lines and prepare such additional specifications as may be considered necessary.

Special Committee No. 6—(a) Continue the study of trolley wire wear and breaks, with special reference to breaks due to causes other than normal wear, using the method outlined in previous reports and giving comparative wear on the basis of the car-miles operated; (b) determine to what per cent of the original cross sectional area trolley wire may be allowed to wear with maximum economy and safety, and (c) determine the practical and economical sizes of trolley support ears for general use and for various classes of service.

Special Committee No. 7—(a) Continue the study of inductive co-ordination and radio co-ordination maintaining contact with the American committee on inductive co-ordination, and (b) be prepared at any time to furnish information that may be desired.

Special Committee No. 8—(a) Continue the study of standardization of trolley wire reels, with the purpose of standardization, and (h) investigate braking devices on reels, in stringing trolley wires. Note: This committee should work in conjunction with the proper committee of the Division of Simplified Practice of the Department of Commerce in connection with the standardization of trolley wire reels.

Special Committee No. 9—Review Manual Section D 200-26, Specification and Form of Contract for Electric Conduit Construction, to determine the need for revising and enlarging this section in accordance with the suggestions made by the 1927 power transmission and distribution committee.

Special Committee No. 10—Study lightning protection of both car and line equipment. Note: This committee should consist of a joint committee of rolling stock and distribution engineers, in order that both phases of the subject may be given adequate consideration.

Special Committee No. 11—Investigate the comparative cost and reliability of overhead and underground d.c. distribution systems. This to include installation, operation and maintenance; obtain definite information from which city engineers and others interested in placing wires underground can be informed as to the relative costs and advantages of the two methods of distribution.

Special Committee No. 12—Investigate the use of ferrous and non-ferrous materials for overhead construction.

Special Committee No. 13—(a) Study the question of proper trolley voltage for congested urban districts with a view to determining the most desirable voltage under general conditions from the standpoint of operation and economy. To include the determination of the lowest trolley voltage which is suitable in city areas where it is impossible to reach the normal operating speed of the cars. Such things as operation of auxiliaries, such as lamps, air compressor motors, etc., to be considered, and (b) continue the study of the proper design of the distribution layout for automatic substations with particular reference to ties between stations and the use of sectionalizing switches.

Special Committee No. ( )—Determination of a measure of the use of labor and material in trolley line maintenance. Develop the practicability of establishing a standard by which the various methods of operating and maintaining overhead lines may be compared. Note: No committee has yet been organized to handle this subject, which was not discussed at the executive committee meeting, Oct. 5, 1927.

Purchases and Stores Division

Special Committee No. 1—Review existing purchases and stores sections of the Manual for revisions and corrections.

Special Committee No. 2—Study the advantages and economics of unit piling and standard packages and recommend a suitable system for use on electric railway properties.

Special Committee No. 3—Make a study of investment in material and supplies and the cost of operating stores with an analysis of the underlying data as to: (a) What is included in the account of Materials and Supplies by the various member companies; (b) what is charged to the account of Stores Expense; (c) what is the relation of stores expense to gross earnings, to cars and buses operated, to total investment in plant, to monthly disbursements, or to any other feature of investment or operation which will afford a basis for comparison and control, and (d) what are the physical or operating circumstances, if any, which have a special influence on the subject; also suggest the most practical and effective method of gaging the cost of operating stores to be used as a guide to good practice.

Special Committee No. 4—Recommend methods and practices for keeping price records and pricing materials and supplies received and issued.

Rolling Stock Division

Special Committee No. 1—(a) Review existing equipment Manual section with the exception of those referred to in 1 (b) below: (b) The standing committee on rolling stock will continue its study of revisions proposed in the 1927 report of way and structures committee No. 1, in Manual sections B 100-23, B 101-25 and B 201-24.

Special Committee No. 2—(a) Continue the subject of motor coach design and standardizations; the committee to continue to work in conjunction with the standardization committee of the Motor Coach Division and the Society of Automotive Engineers; (b) investi-

gate maintenance methods and inspection schedules and consider prescribed standards covering limits of wear parts as a means of efficient and economical maintenance; (c) consider the matter of bus design from the standpoint of unit construction and accessibility to wearing parts which is of vital importance to economical maintenance, and (d) consider the standardizations of automotive foundation brakes, metallurgical content of drums and other features of the braking problem that would tend to improve conditions.

Special Committee No. 3—(a) Continue the study of car equipment with special reference to appearance, comfort and convenience. Work to be co-ordinated with the committee on unification of car design. This study to include subjects of car nosing, ventilation and the need of a thrust device for journal boxes, and (b) investigate the relative economies of new types of power drives.

Special Committee No. 4—(a) Investigate the subject of head and tail lighting requirements, in addition to rear end markers and any other accessory lighting, such as signal lights and destination lights; (b) investigate the illumination of electric railway properties from trolley voltage supply, and (c) continue the study of car lighting with a view to improvements and economies due principally to standardization and uniform practices. Develop recommended practice in lamp inspection on proper specifications for lamps for a given system.

Special Committee No. 5—Continue study of results being obtained with roller bearings for journals.

Special Committee No. 6—Continue the study of gear lubrication.

Special Committee No. 8—Continue to investigate side wear on brushes of ventilated motors.

Special Committee No. 9—Continue the study of reduction of noise in car operation.

Special Committee No. 10—Investigate the welding of wheels, flanges, collaborate with way and structures committee No. 6.

Special Committee No. 11—Continue study of overhead current collecting devices and recommend standards for trolley wheels.

Special Committee No. 13—Continue the study of limits of wear.

Note: Special committees No. 7 and No. 12 have been discharged for the current year.

Way and Structures Division

Special Committee No. 1—Review existing sections of the Manual on buildings and structures, way and wood preservation.

Special Committee No. 2—(a) Continue study of design of switch tongues and hard centers for special trackwork; (b) review specifications for castings in iron-bound, hard-center special trackwork, with the view of possible revision of requirements for depth of casting and general design; (c) study of design of expansion joints for street railway track; (d) maintenance standards for track switch tongues in paved streets. Note: Establish, if possible, a maintenance standard for electrically actuated track switches in paved streets. Switch points so operated should require closer attention as to cleanliness, limits of wear, adjustments, etc., than those not so operated. It is believed, however, that a standard of maintenance for electrically operated switches might be applicable also to manually operated switches. (e) Prepare suitable plans for street railway spring switches and frogs and prepare a specification and drawing of a suitable spring-actuating device, all of which is to be incorporated in Manual Section W-108-23; (f) prepare a special design or plan for the use of narrow-tread wheels, of double spring rail frogs with a spacer between the two movable wings so that they are only partly spring acting.

Special Committee No. 4—(a) Study matter of type of ballast for track construction in paved streets to determine the relative advantages of each type with special conditions of subsoil, car loadings, etc.; (b) investigate the use of vitrified or tile pipe auxiliary drains in connection with track construction in paved streets.

Special Committee No. 5—(a) Study of treatment of poles and timber in place; (b) study actual economies obtained by operating utilities through the use of treated timbers; (c) study wood preservatives other than creosote and zinc chloride, and (d) investigate the possibilities of a combination preservative fire preventive treatment for timber.

Special Committee No. 6—(a) Study arc welding processes for repairs to rails and manganese steel, co-operating with the Welding Society, and, (b) prepare welding wire specifications.

Special Committee No. 7—Investigate the possibilities from the use of alloy steels other than manganese for special trackwork purposes. Observations to be continued of installations of chrome nickel steel in special trackwork and that the experiment suggested by last year's committee be carried to conclusion.

Special Committee No. 8—Study types of pavements, contour and foundation and recommend types of construction suitable for the modern heavy load conditions on city streets.

Special Committee No. 9—(a) Study the effect of garage design on insurance rates (in co-operation with the N.F.P.A. and other interested organizations). This should include such items as (1) Types of heating plants, (2) design of inspection pits, (3) gas, oil and water servicing facilities for buses, (4) floor drainage, (5) ventilation, (6) fire extinguishing apparatus, including automatic sprinklers; (b) study of door design to include recommendations as to proper width of door openings, details of construction and general arrangement. This should cover such types as single or multiple sliding doors, plain hinged doors, rolling lift doors, jackknife or folding type and any other on which information may be obtained; (c) study maximum floor grades for bus garages; (d) study illumination both natural and artificial; (e) study bus washing facilities; (f) study provisions for compressed air lines for inflating tires, and (g) general study of ideal layout for various street frontage condition.

Special Committee No. 11—Co-operate with the A.S.M.I. in the consideration of any changes in the track and pavement construction specifications which may be proposed by either organization.

Special Committee No. 12—Continue study of rail corrugation; (a) continue collection of data from companies which are now co-operating, and (b) install sections of track for test purposes, with the end in view of determining a type of track which will better resist corrugation.

Special Committee No. 13—Study design of joint railway and bus terminals.

Special Committee No. 14—Study subject of rebranding rails to obtain uniformity in practice. Committee to study branding practice established by A.E.R.E.A.

Special Committee No. 15—Prepare a design of track gages for measuring and checking gage of track. Check gaging points on rails and wheels to determine if present practice is correct.

Special Committee No. 16—Study the subject of foundation and supporting structures for steam railroad crossings and other special work layouts.

Note: Special committees No. 3 and No. 10 have been discharged for the current year.

Committee on Heavy Electric Traction

1. Review existing Manual sections.
2. Continue study of track and third rail bonds for heavy traction work.
4. Continue study and collection of data on branch lines electrification and self-propelled cars and locomotives.
5. Continue study of operation of articulated trains, collecting descriptive information.
6. Study train make-up and terminal switching with multiple-unit cars, collecting and compiling data on same.

The report was signed by F. H. Miller, chairman; Morris Buck, C. H. Jones and P. V. C. See.

Service Betterment

WORK for the coming year was planned at a meeting of the committee on service betterment held at association headquarters, New York City, on Dec. 13. It was decided to concentrate on three subjects: Speed, training employees, and utilizing old equipment to the best advantage. Subcommittees were appointed to study each of these subjects. The next meeting will be held at Cincinnati in January at the time of the meeting of the Central Electric Railway Association. Members present at the meeting were W. E. Wood, chairman; R. N. Graham, J. F. Craig, E. A. Palmer, C. W. Wilson, E. E. Bodine representing C. L. Van Auken, and Paul Wilson, sponsor.

News of the Industry

Messrs. Hughes and McAdoo Appear in Piedmont Case

Oral argument was heard on Dec. 9 before the Interstate Commerce Commission on the application of the Piedmont & Northern Railway to construct an electric line from Spartanburg, S. C., to Gastonia, N. C., a distance of 53 miles, and from Charlotte to Winston-Salem, N. C., a distance of about 75 miles.

An Interstate Commerce Commission examiner ruled against the proposed construction, holding that it would result in unwarranted duplication of existing railways; would impair their facilities, by diverting their traffic, and would not perform any service that cannot now be performed by existing lines.

Charles Evans Hughes appeared for the Piedmont & Northern, while William G. McAdoo appeared for the Georgia & Florida, which is supporting the Piedmont's application. Mr. Hughes argued that the proposed construction was part of a project begun in good faith prior to the enactment of the transportation act. He asserted that public officials and representatives of various industries were unanimous in their support of the proposal, and termed as a "figment of the imagination" the charge of the Southern Railway that it would injure that road's credit.

The Piedmont & Northern further claims that since it is an electric road it should be classed as suburban and that the commerce commission for this reason does not have jurisdiction. It also claims that since the road was started before the present law became effective, and was delayed in completion by the war, this is an additional reason why the commission cannot take jurisdiction at this time.

The Southern Railway and other steam lines are opposing the application.

Preservation of 5-Cent Fare Involved in New York Suit

In a brief filed on Dec. 9 with the Appellate Division, to which the City of New York has appealed from a ruling of Supreme Court Justice Wasservogel, William G. Fullen, counsel for the Board of Transportation, argues that the preservation of the 5-cent subway fare and the saving to the municipality of millions of dollars is dependent upon the four-year bond policy recommended by John H. Delaney, chairman of the board.

William Jay Schieffelin opposes the board's policy on the method of financing and advocates a 50-year bond program. He brought mandamus proceedings to enforce his theory and to restrain the Board of Estimate from including an item of $13,000,000 for amortization in the 1928 budget.

Included in the brief filed by Mr. Fullen was the assertion that "on the basis of the proposal to issue four-year bonds at 5 per cent, the cost to the city of $1,000,000 of rapid transit bonds would be $200,000, whereas under the existing 50-year bond plan the cost of $1,000,000 in 5 per cent bonds at the rate of $50,000 in annual interest would be 50 times greater, or $2,500,000."

The brief contends that the plans adopted will make possible uninterrupted progress in subway construction without creating a situation which would hinder the continued development of other public works. It urges, also, that a writ of mandamus is not the proper remedy, and that the determination of the financial policy to be adopted is within the discretion of the Board of Estimate and is not subject, under the terms of the city charter, to judicial review.

The brief denies that the Board of Estimate is restricted to the issuance of bonds for a minimum of twenty years duration, as Mr. Schieffelin contends. It contends that the financial policy advocated by Mr. Schieffelin would be very costly to the city in comparison to that formulated by the Board of Estimate.

Elimination of Parking in Downtown St. Louis Recommended

Director of Streets and Sewers Brooks of St. Louis, Mo., has caused to be presented to the Board of Aldermen a bill to eliminate all daytime automobile parking on Washington Avenue, Locust and Olive Streets in the downtown district. No parking will be permitted on the streets named between Fourth Street and Twelfth Boulevard between the hours of 7:30 a.m. and 6 p.m.

Director Brooks declared that this legislation was vital because "traffic was strangling itself through its own bulk." He took the position that parked cars at the curbing in the retail business sections of the city not only impeded the free movement of street cars, buses and other automobiles and horse-drawn vehicles, but also discouraged downtown shopping.

Clearing the Atmosphere in Chicago

City Council and companies resume franchise negotiations. Corporation Counsel to study company suggestions and report back. Mayor Thompson to take a hand

REFUSAL of the surface and elevated lines of Chicago to accept a franchise for a fixed term of years or for legislation providing for termination of grants by forfeiture of their properties marked the reopening on Dec. 9 of the first joint meeting of local railway executives and the members of the City Council transportation committee since the bills representing the city's views on legislation necessary to solve the local transit problem were completed and handed over to the companies for study and revision on Dec. 1.

The principal differences between the revised bills and the companies' bills, which were killed at the last session of the State Legislature, are the provisions for granting by the city of either a terminable permit or a long-term franchise and for increased representation of the city on the proposed local transit commission.

Patrick J. Lucey, attorney for the Chicago Rapid Transit Company and also delegated to speak for the Chicago Surface Lines, contended that the forfeiture clause was unnecessary in the terminable permit bill, whereby the city would be allowed to specify in its ordinance what should constitute cause for termination, and that it would have a bad effect on the sale of the securities of the proposed unified transportation system. He said that in order to finance the proposed consolidated system perhaps as much as $500,000,000 would be required. As he sees it, the public would only invest its money in these securities if it were sure that they were safe from political interference. He illustrated this point by referring to the present depreciated value of Chicago Surface Lines securities. The value of these lines as shown by their capital account, he said, has probably greatly increased, but under the rigid twenty-year franchise the value of their securities will probably never increase.

In lieu of this feature, Mr. Lucey proposed an amendment allowing the city not only the right to buy the lines itself in case of non-performance, but to designate a purchaser to act under the same terms as those open to the city.

In commenting on the third bill, amending the cities and village act to permit term franchises for a period not to exceed 40 years, the companies' spokesman repeated that only a terminable franchise is acceptable. If, however, the bill is approved, he suggested that the length of the term

grant be left to the option of the City Council. In reply to the Aldermen's objections that such an arrangement would remove the city's only safeguard against franchise abuses, Mr. Lucey declared that the people would be amply protected by "home rule" and the right of appeal to the courts. He said the companies were perfectly willing that the city and the public be protected, if the companies also were protected against confiscation.

Except for a few changes in legal phraseology, the consolidation bill is acceptable to the companies, as is the bill which would create a local regulatory commission.

The railway attorney's criticisms were forthwith referred to the city Corporation Counsel, who will study them in company with the local transportation sub-committee and make recommendations back to the full committee.

A Necessary Supplement to a Luxury

Baltimore brief so sees the street railway of the present day. Picture of changes affecting electric railways presents economic factors in a fascinating way and in terms readily understandable

DECISION is expected soon in the case now pending before the Public Service Commission of Maryland in which the United Railways & Electric Company, Baltimore, seeks:

(a) A flat 10-cent fare, with corresponding increased special fares.

(b) An increased annual allowance for depreciation that will approximate 4 per cent of the value of its depreciable property.

Briefs were filed by the company and by attorneys representing opponents, and arguments were made before the commission on Dec. 8 and 9, after a protracted hearing, during which 122 exhibits were filed with the commission by all the parties. The company contends that without the advance in fare and an increased depreciation allowance it cannot render adequate service and earn a return on its property consistent with its constitutional rights. The company seeks "not less than a fair return on the fair value of the property and not more than the value of the service to the customer."

The company's position as stated in its brief is:

1. "Flat" 10-cent fares (with corresponding increased special fares) are in themselves reasonable to its customers — not more than the service is worth.

2. Such increased fares will yield the company less than a fair return on the fair value of its property—even less than the constitutional protection against confiscation.

3. Compulsory limitation of the company's rates to yield a maximum of less than 8 per cent is confiscatory.

The company contends that "a 10-cent fare would now give the customer more for his money than the pre-war 5-cent fare gave him." It offered evidence to show the public's capacity to pay the 10-cent fare and discussed the changed conditions in the electric railway business as a result of the increased number of private automobiles now in use. It declares that the railways today are "a necessary supplement to a luxury."

The company states in its brief:

. . . the very nature of the service has been revolutionized. The population lives—and to a considerable extent dies—on wheels, moving or parked; not street car wheels. Automobiles not only take traffic from the street cars; they block what they do not take. Municipal regulation only aggravates the parking nuisance; automobiles are kept moving from place to place playing "tag" with the public. The number of automobiles participating in the nuisance—and the extent of the interference with street cars—is thereby increased. Pleasure riding on street cars is a thing of the past. Children and flappers alike get no "kick" out of a street car ride. The company still conducts pleasure resorts, which provide the jazz necessary to existence, but the patrons (who can neither park a street car no "step on the gas" in one) are largely transported there in automobiles.

Formerly the exclusive means of transportation for practically all, the street car is still a vitally necessary service for practically all, exclusive for almost none. Seventy-five per cent, men and women, go to and from work on street cars, 25 per cent in automobiles. For the 25 per cent the street car renders "break-down" service only; for most of the other 75 per cent a supplemental, stand-by service. The majority of families in and around Baltimore must own an automobile; perhaps the majority of the 75 per cent who go to work on street cars. Those who do not own automobiles are largely transported by those who do; many, both white and colored, use some of the 4,000 taxis, who never used the 233 hacks and cabs of twenty years ago; others patronize "drive-it-yourself" concerns. The workers, men and women, use the street cars at the same peak hours; other members of the same families use the family automobile at off-peak hours. Thus, while the company's passenger revenue and revenue passengers continue to decrease, its peak burden is actually increasing. The public demand for the automobile has thus changed street car service from an exclusive, all-day, night and holiday service into a peak and stand-by service, essentially different and more expensive, though still far less expensive than the automobile.

The value of the service rendered by the company and the public's capacity to pay for it "are alike demonstrated by the very demand for automobiles which has made this service necessary and the capacity to pay which has made this demand possible," the brief states.

The company points out that the use of automobiles has increased even more than the number. The company says:

Generally speaking, service worth having is worth what it costs, including in such cost, of course, a fair return on capital. This is the economic law in the competitive field when buyer and seller are free to pick and choose unregulated and unrestricted. Prices fluctuate up and down with fluctuations in demand and supply; when demand and supply are balanced prices reach their normal level at cost of production (i.e., reproduction.) Public regulation does not diminish the value of service, though it may diminish or, unwisely exercised, may increase the cost of service. Though a street railway system remunerative as a whole may under exceptional circumstances include some unremunerative parts, the general rule is that not only the whole business but each part should yield substantial compensation over cost. Certainly the service as a whole, if it is worth having, is worth paying for.

The point is made that "value of service to the customer is not less, but may be and frequently is much more than is commonly paid for such service." What is paid in other cities is held not to be conclusive as to what ought to be paid in Baltimore, "because costs—and also franchise conditions and other contractual legislation preventing fare changes—are seldom the same in two places." Nevertheless, says the company, the fact that 219 cities throughout the country have a base fare of 10 cents, and that Boston and 29 cities smaller than Baltimore have a flat fare of 10 cents, "is conclusive evidence that 10 cents is not more than a street car ride is worth. In other cities lower fares are less than the service is worth. If a fare lower than 10 cents would yield this company a fair return on its property, then such a fare would enable the customer to get the service for less than its value to him. Since a lower fare will not yield a fair return to the company the customer is not entitled to such a saving; in a 10-cent fare, however, he will pay no more than the service is worth."

The company meets squarely the prophecy that an increased fare would cause "losses of business so heavy as to decrease revenue in spite of increased fares." After the increase to 7 cents on Dec. 31, 1919, passengers increased 10,000,000, from 244,000,000 in 1919 to 254,000,000 in 1920. The decrease to 225,000,000 in 1926 includes the loss of 10,000,000 fares (not passengers), though counted as passengers, through zone extensions," the brief states. The company says:

Sometimes increases, sometimes decreases in railway business have occurred after fare increases or decreases but seldom have resulted from them. Not only in Baltimore but in Boston and throughout the United States, whether fares have been increased to 10 cents or to lower amounts or have been decreased, the evidence shows no substantial effect of fare increases or decreases on the volume of business. Even if the data submitted had shown that in most cases increases in fares were followed by a noticeable falling off in riders, and vice versa, this alone would not indicate that such change in fare was the cause of the change in riders, because fare increases are ordinarily applied for and

granted on a falling traffic and fare reductions ordered when business is increasing. As. Dr. Hollander (Jacob H. Hollander, professor of political economy Johns Hopkins University) expresses it, the demand for street car rides is relatively "inelastic." The last decade of street railway history, including the disastrous story of receiverships of many interurban and suburban and a number of urban street railways, reveals practically nothing about the economic limit to productivity of increased fares. Not one instance has been found of a company which lost money through too high fares or has gained or saved money through reducing or not increasing fares.

An interesting statement is made in reply to pleas of opponents of the company that the commission consider the "necessitous rider" and the social plight of the unemployed and of the entire families. Says the company:

If the term "necessitous rider" is intended to indicate the fact that the company's service is a necessary service, this fact is admitted; to none is the service more necessary than to the automobile owner who uses it as "break-down" service and stand-by service. The necessity for the service is no reason why it should not be paid for. If "necessitous rider" means the rider who does not own an automobile, then it is equally true (1) that the changed economic conditions caused by the automobile, not by the company, are facts which can no more be escaped by the company or by those who do not own automobiles than changed physical conditions can be escaped by the hapless pedestrian and (2) that with generally increased wages and standards of living the minority families who do not own automobiles are even better able to pay carfare than the majority who have automobiles to support. The unemployed, like the sick, the injured, and other unfortunates, cannot get food, clothing or shelter without paying for it, but they need not pay carfare at all.

The following paragraph is an interesting commentary on the changed social life of the public:

Women do not go to work to pay carfare; they may pay carfare to go to work. They go to work in increased numbers largely to help pay the cost of automobiles and other luxuries formerly rare, now general. Formerly the same street car carried a man to work at the peak hours, a woman shopping at off-peak hours, and in summer both to a park or pleasure resort at night. Now street cars carry both the man and woman to work at the same peak hour, neither of them at other hours while they are at work or at night while they are out in an automobile. Thus the amount of railway business is decreased, but at the same time the peak load is increased.

In discussing the economic changes further the brief states:

No other utility has suffered an economic revolution more complete or more obvious than the change in the railway business from a monopoly of local transportation for both necessity and pleasure, operated at minimum expense, to the status of a supplement, albeit an indispensable supplement, to the automobile, which now dominates transportation, not to say life itself in America. An inexpensive necessary monopoly has become an equally necessary but also expensive supplement to a more expensive luxury. The bulk and the burden of transportation still are and must continue to be borne by the street railway; the changed conditions of this transportation, however, including diminished receipts and increased expense, are controlled by the automobile.

In every aspect of the matter the passenger who pays a 10-cent carfare in the Age of Jazz gets more for his money than did the passenger who paid a 5-cent carfare in the Age of Innocence.

In an exhibit filed with the commission the company estimates that its revenue for 1928 on the basis of flat 10-cent fares would be $5,578,079, or 7.1 per cent of $78,005,270, the fair value of its property. It contends that this return would be less than a fair return on the fair value, "even less than the constitutional protection against confiscation." In making its estimate the company provides an allowance of 3 per cent decrease in passenger revenue to cover the present decrease in revenue passengers, and 2 per cent to cover any possible decrease due to increased rates.

The company also is contending for an increased depreciation allowance. It declares that $2,200,000, approximately 4 per cent of the undepreciated base value (exclusive of overheads and going value) of the company's depreciable property as valued by the commission, plus additions since Jan. 1, 1924, would be a reasonable annual allowance, in order to provide for retirements as they occur from year to year, without accumulating any substantial reserve.

It also contends that "compulsory limitation of the company's rates to yield a maximum of less than 8 per cent is confiscatory." The brief says:

For some years railway properties have not been earning 8 per cent. The return has not been sufficient to induce investors to build railways at all or to buy them on the basis of an expected return of less than 8 per cent. Railways have been unable to complete successfully for capital with other lines of industry. The credit of either a power company or a telephone company is much better than that of street railways. The most serious hazard of railways is inability to get a return. Another hazard of utilities is the difficulty in promptly advancing their rates to overtake increases in cost of operation. In all these respects the condition and the credit of railways are worse than before the war.

Meeting the question of opponents, "Why should the expense of a declining business fall on its present customers in increased fares?" the company says:

Why not, if the fares are not more than the value of the service to the customers and not more than a fair return to the company? Even in a self-exhausting business, regulated or unregulated, e.g., natural gas, coal, oil, etc., service must be paid for at what it costs. Constitutional rights of property are the same in respect to a waning business or a growing business. The company's business, however, is not a waning business as to customers, though it is as to earnings. Its propery is all used, useful and necessary in the public service: its service is used by everybody, but not to the same extent as formerly. The peak burden on the company and its property continues to grow. The public, who require this peak service, make less use of the company's service at other times than it formerly did. All this is no reason why this changed service should not be paid for at a changed price necessary to compensate for the changed cost caused by the changed use which the public sees fit to make of the company's property.

Another Readjustment Move Presaged in New Jersey

Amended articles of incorporation have been filed for the Public Service Transportation Company, Newark, N. J. The move is believed to be the result of almost a year's work on the part of a committee of directors appointed to work out a plan for the readjustment of the transportation units of the Public Service Corporation. The transportation company is the bus operating concern and the only changes made by the new articles of incorporation are in the charter which is now issued under the transportation act. The Public Service Railway is the trolley operating company of the corporation. Under the new charter the transportation company will have 1,500,000 shares of common stock, of no-par value, which is the same amount as now held by the old transportation company organized under the general corporations laws. Under the traction act it will be possible to merge the two transportation units of Public Service when the time comes.

Agreement Reached in Chicago

Following a series of conferences between the operating board of the Chicago Surface Lines and representatives of Local 241 of the Amalgamated Association, a supplemental agreement for arbitration of wages and other points at issue was signed on Dec. 12. The agreement removes the possibility of a strike and as a result the proposed mass meeting of the union set for Dec. 14 was canceled by William Quinlan, president.

Under the terms of the new agreement, Judge Scanlan and Mr. McIlraith, appointed last summer, withdrew as arbitrators and Guy A. Richardson, vice-president of the Chicago Surface Lines, representing the company, and Alderman Oscar F. Nelson, representing the union, are appointed in their stead. If they cannot reach an agreement, they must proceed to select a third man and then consider the whole matter. In case of an agreement between the two arbitrators, they are empowered to make an award which can be continued in effect until June 1, 1930, but if they require the assistance of a third arbitrator the award can be extended only to June 1, 1928. The two arbitrators are to meet from day to day for the purpose of reaching a decision.

The agreement was submitted to and approved by Judge James H. Wilkerson of the United States District Court, owing to the fact that the Chicago Railways, one of the underlying properties, is in receivership in this court.

They Miss Their Interurban, Do Holland Merchants

When the Grand Rapids, Holland & Chicago Interurban Company went out of existence last year it proved a bad blow to industries in the city of Holland, Mich. In the southwestern part of the city were many industries that were equipped with sidetrack facilities to the interurban line, assuring them prompt shipments day or night. When the interurban road was junked the industries had forcibly brought to their attention the value of the interurban to the city. Shipments were delayed, trucks had to be purchased and resort made to other measures in meeting the need of shipping facilities.

A Chicago company tore up the tracks leaving the right-of-way in the hands of the Consumers Power Company, Grand Rapids. Now these industries have awakened and have leased the side track rights-of-way and are using the interurban rails to finish connections with the Pere Marquette Railroad with which they were formerly tied by rail. The interurban roadbed is being used, but new switches, rails and other equipment are being installed by the Pere Marquette Railroad.

Ten Cents in Lansing

New fare rates on the lines of the Michigan Electric Railway in Lansing, Mich., went into effect on Dec. 14. The new rate is 10 cents cash, with three tickets for 25 cents; 5-cent children's fare and seven workmen's tickets for 50 cents.

Information Bureau in Baltimore

The United Railways & Electric Company, Baltimore, Md., has opened a general information bureau for the public at 5 South Calvert Street, Baltimore, with Harry W. Mears of the company's service department in charge. Here complaints will be received and adjusted and all information dealing with the railway system and the city generally will be supplied.

A Wise Administration Expected in St. Louis

The press no less than the public has started the reorganized St. Louis Public Service Company on its new task with encouragement and hope for a bright future. In its editorial columns the St. Louis *Globe-Democrat* has this to say on the new start for the electric railway system:

> And St. Louis may take courage in viewing the character of the directors elected to manage the new Public Service Company. They are local men of affairs who have displayed their talents for the direction of large enterprises in many ways. They personally enjoy and deserve the confidence of the general public and are intensely interested in the progress of St. Louis, and the surrounding territory as a business community and a home center. Aside from uprightness of character, these directors will take a broad view of their responsibility in handling the affairs of the transportation company and build for the stockholders and for the community in conformity with the mutuality of interests.

A New Guide for Milwaukee Visitors

A new railway and bus guide of Milwaukee, Wis., and suburbs containing a map and index of streets, parks and other points of interest is being distributed by the Milwaukee Electric Railway & Light Company. The map in a greatly enlarged form is being placed in hotels and newspaper offices.

For the Benefit of St. Petersburg Pass Purchasers

R. E. Ludwig, director of public utilities at St. Petersburg, Fla., has announced that arrangements have been completed for the sale of weekly passes and street car tokens for the municipal railway at the new municipal bureau of information and complaints at the City Hall each Saturday afternoon hereafter. The passes go on sale regularly each Friday for the following week at the municipal railway office in the finance department, but that office is closed to the public at noon on Saturday, when the sales will be transferred to the information bureau.

Ten Cents in Atlanta

Ten cents cash, four tickets for 30 cents or twenty for $1.50, with school children's rates, 5 cents, are the new fares to be charged by the Georgia Power Company, Atlanta, Ga., set down in an order of the Georgia Public Service Commission on Dec. 6. The present fare is 7 cents cash, three tickets for 20 cents or fifteen for $1, with no children's rates.

The school children's tickets are to be sold in lots of twenty for $1 at the company office on presentation of a certificate signed by the principal or teacher. These tickets are good on school days between the hours of 7 a.m. and 4 p.m.

In the company's petition to the commission a request was made for a 10-cent cash fare and three tickets for 25 cents.

Office Changes Made

Passenger and freight offices of the Chicago, North Shore & Milwaukee Railroad in Milwaukee have been moved from the Security Building to the terminal building of the road. The space formerly occupied by the restaurant has been remodeled. B. W. Arnold and the legal and medical representatives will remain in the Security Building.

New Routes Opened in the Twin Cities

Operation of cars of the Minneapolis Street Railway, Minneapolis, Minn., over the new bridge across the Mississippi River to a point adjacent to the plant of the Ford Motor Company in St. Paul was begun Dec. 2, the day the new Ford car models were put on display in the Twin City plant. The tracks were laid several months ago, but the Kenwood-East 25th line has heretofore looped several blocks from the bridge. Extra service was put into effect on the Randolph-Hope line to the Ford plant by the St. Paul City Railway in anticipation of increased activity there.

The Bryn Mawr line in Minneapolis was reopened Dec. 3 over a new bridge across the Great Northern & Minneapolis & St. Louis Railroad tracks after being interrupted several months. This enables the company to reduce emergency bus service to Bryn Mawr by another route.

Extension of the Franklin Avenue line in Minneapolis and a proposed route to serve prospect Park residents up to the St. Paul city line has been approved by the City Planning Commission, and was reported as being up to the City Council for action. The route obviates engineering problems due to grades by direct extension across Franklin Avenue to the city limits.

Free Rides in Fort Wayne

An innovation in transportation was tried out Dec. 1 in Fort Wayne, Ind., with fine results with the Indiana Service Corporation aiding in opening the Christmas shopping season in the downtown business district by providing free transportation to every one between 6:30 and 7:30 in the evening in order for them to get to the shopping district early and free. Hundreds took advantage of the offer and went to the business district who would probably not have gone otherwise. The free ride stunt appears to have paid big dividends in good will.

Educational Courses in Michigan City

A short course for the benefit of its employees to acquaint them with the essential facts concerning the line and its operations and to fit them to tell the railroad's story to the public has been started by the Chicago, South Shore & South Bend Railroad. The first meeting of the class in which members of all departments are enrolled was held Dec. 1 in the South Shore Line's new Michigan City, Ind., station. The course of instruction will consist of a two-hour session one night each week for eight weeks. A well known lecturer and public speaking authority of Chicago is in charge. Students will be instructed in public speaking and the operation of stereopticon and moving picture machines.

Public Hearing on Kansas City Short Line Project Concluded

Public hearing on the application of the St. Louis & Kansas City Short Line Railroad for a certificate of convenience and necessity for the operation of an electric railway between St. Louis and Kansas City was concluded by the Missouri Public Service Commission on Dec. 9. J. B. Collins, Kansas City, one of the chief promoters of the enterprise, declared on the witness stand that he believed the bus and motor truck competition with the railroads was not the bugaboo that the steam railroad officials believed it to be.

Mr. Collins was subjected to a searching cross-examination by Judge J. F. Green of the Missouri Pacific, Carl Hoffman of the Missouri-Kansas-Texas and L. H. Stroesser of the Wabash. They were especially anxious to ascertain how the short line railroad, if built, would develop new business to support it. In reply he stated that new business would be developed by the establishment of industries along the line and through the development of resources that are now dormant. He estimated the business of the new road would total $5,000,000 annually. Judge Green in this connection pointed out that $5,000,000 was more than the annual business of any of the steam railroads between St. Louis and Kansas City. Mr. Collins answered that he felt his line would get the bulk of the business for the reason that it would be the shortest line between the cities and that it would operate through trains on a five-hour schedule, while at present the steam lines require seven hours for the trip.

The commission will fix a date some time in January for hearing arguments of counsel in the case. In the meantime both sides will file briefs. The Wabash, Missouri-Kansas-Texas, Chicago & Alton, Chicago, Burlington & Quincy, Chicago, Rock Island & Pacific and Missouri Pacific lines opposed the application of the interurban line. The line has sought since 1925 to obtain a permit to construct and operate. The commission rejected the first application on the ground that the company was not in a position to show its financial backing. A new application was filed Oct. 7.

Men in St. Louis Propose Wage Survey

W. R. Schneider, attorney for the local division of the Amalgamated Association, has been authorized to conduct a survey of the wage situation and also living expenses in other large cities. He has indicated that it will be several weeks before he is ready to report to the wage committee, which has been authorized by the executive committee to seek a revision of the wage scale in force by the St. Louis Public Service Company. Union officials say that St. Louis ranks ninth in the cities paying the highest wages to trainmen, now paid 56 to 67 cents an hour, according to length of service. Men working as laborers in the track division receive 38 to 45 cents an hour.

A Railway Employs Boy Scouts

The Retail Merchants Association of Lynchburg, Va., unable to charter street cars to haul their prospective Christmas shoppers to the stores, hit upon the happy idea of placing a Boy Scout, with a pocketful of nickels, aboard each car of the Lynchburg Traction & Light Company for one hour one morning recently. The youngsters distributed fares to all who requested them. Hundreds of women shoppers took advantage of the offer.

Hearing on Petition Postponed

Hearing on the application of the Pacific Gas & Electric Company and the Central California Traction Company for a 7-cent fare in Sacramento, Cal., has been postponed until Jan. 4. It had been scheduled for Dec. 6. The present rate in Sacramento is 5 cents.

"Northern Lights" on Thursday Nights

The Northern Ohio Power & Light Company, Akron, Ohio, continues to broadcast a program every Thursday night between the hours of 8 and 9 for the purpose of advertising its service. An orchestra has been organized known as "The Northern Lights," and usually there are two vocalists who broadcast over WADC. During the holiday week it is planned to use the First Congregational Church choir and St. Martha's Church choir.

Improved Service Means Higher Fare, Say Madison Employees

Employees of the Madison Railways, Madison, Wis., at their regular meeting adopted a resolution favoring an increase in fare as a solution for the improvement of service. The resolution follows in part:

1. We operate the cars and buses to give the best service we can. We try our best to avoid accidents, to be courteous to patrons, and to run the cars on time.
2. We know the company is spending every dollar of its present income to give the best service it can and that, in spite of this fact, we cannot keep up with the service demands of the public.
3. We have faith in the future of Madison and we want to see our customers have the very best transportation possible, but more and faster service means more double track, more cars, more buses, more employees, and more expense all along the line.
4. We are confident that the one and only way to thus improve the service is to grant the Madison Railways an increased rate of fare.

Proposal for Lengthening New York Subway Platform

The question of lengthening the Interborough subway local station platforms and the desirability of ordering the Interborough Rapid Transit Company to pay half the cost, estimated at about $16,000,000, was discussed by the New York Transit Commission on Dec. 13. Representatives of the company have questioned the interpretation of the commission that the contract requires the company to pay half the cost of improvements and have threatened to appeal to the courts if ordered to pay it.

Denver's Perpetual Franchise Upheld

The United States Court of Appeals has upheld the decision of the lower federal court to the effect that the Denver Tramway, Denver, Col., has a perpetual franchise. The franchise was signed in 1885 and 1886. It stipulates a 5-cent fare, but the fare was changed by the court from 5 cents to 6 cents during the World War. Judge Lewis in the federal court later raised the rate to 8 cents cash with two tokens for 15 cents. This is the fare now in effect.

President Howard S. Robertson says the company is being operated economically, but it is not paying anything like the 7½ per cent allowed by the court. The directors of the tramway, after they receive a full transcript of the Appellate Court's ruling, will meet and then a statement will be made as just what the company proposes to do.

Safety Via Radio and Poster Display in Jacksonville

Features of the safety campaign being conducted by the Jacksonville Traction Company, Jacksonville, Fla., in which all trainmen who operate 80 working days without a chargeable accident will receive turkeys for Christmas, were outlined over WJAX, the Jacksonville municipal broadcasting station, recently by the Rev. James Barbee, pastor of the Riverside Avenue Christian Church. This campaign as an important factor in cutting down the number of accidents was referred to by the Rev. Barbee, Herbert R. MacMillan, chief of the city's fire department, and Lieut. Francis Smith, head of the city's police traffic department, who spoke over WJAX in connection with the safety exhibits at the Florida State Fair and Exposition, sponsored by the Jacksonville Motor Club.

The Jacksonville Traction Company's exhibition at the fair has been favorably received by the local newspapers, which have devoted much space to news stories and photographs of the company's display. The main feature of the railway's exhibit is an impressive poster display. Some of the posters show in picture form the dangers of

passing from behind one street car onto the tracks of another and depicts other careless moves which have at times caused fatal accidents. A lesson for the operators is also seen in the posters. They will be placed on the street car property after the fair. Other signs ask the co-operation of the public and emphasize the increasing convenience of street car riding.

Stricter Safety Observance Recommended in Indianapolis

A letter has been sent to all electric railways operating in Indianapolis, Ind., signed by Claude M. Worley, Chief of Police, asking a stricter observance of the law requiring street car and interurban conductors to flag railroad crossings before crossing.

Continuation of Railway Service Ordered in Goshen

The well-known "one-horse" town has nothing on the "one-car" town of Goshen, Ind., which narrowly escaped being a "no-car" town recently by action of the Indiana Public Service Commission. In an order issued Dec. 2 the commission ruled that the single street car operated by the Chicago, South Bend & Northern Indiana Railway in Goshen be kept in service despite the fact that the company suffered operating losses last year of about $2,000. The commission ordered the railway to file a schedule for the continued operation and to see that such schedule was "reasonably observed."

A petition asking authority to abandon local service was filed by R. R. Smith, receiver for the railway. Accidents, it was alleged, were responsible for half the loss suffered in 1926. Patrons objected to abandonment.

$20,000,000 for Reading Electrification at Philadelphia

Some of the plans for the electrification of its railroad lines in and about Philadelphia were announced on Dec. 14 by Agnew T. Dice, president of the Reading company. Engineers of the company are actively engaged in completing plans for the electrification of the road from the Reading Terminal to Chestnut Hill, 12 miles from the city. Other improvements are predicted on the completion of this work, and when the Chestnut Hill line is in operation the company anticipates making extensions of electric service to Lansdale, on the Bethlehem branch, and from Glenside to Willow Grove, Pa. The next step will be a continuation to the New York branch, with the first projection of service being made from Jenkintown to Langhorne. The expenditure will be approximately $20,000,000, and the company anticipates embarking on the program within a few months.

Recent Bus Developments

Denial of Railway Petition to Revoke Bus Grant in New York

The Public Service Commission denied on Dec. 13 a petition by the New York State Railways to revoke the certificate issued May 6, 1920, under which the Clark Motor Service now operates over certain streets in Oneida and to Sherrill, N. Y. It further ordered the amendment of that certificate by directing that the bus line operation be limited to certain streets.

It was alleged by the railway that the bus company was unlawfully operating in certain streets in Oneida, not mentioned in its certificate and illegally competing with the railway, thereby violating conditions in the bus certificate.

The consent by the city or the certificate of the commission on May 6, 1920, did not specify a designated route in Oneida, but at the hearing before the Public Service Commission, Second District, on April 10, 1920, evidence was presented on the proposed operation over certain streets in Oneida. The commission further held that there was no evidence of intentional or deliberate violation by the bus company in operating over Oneida streets.

Expansion by Cleveland Southwestern

The certificate and property of the Cleveland-Elyria-Toledo Bus Company has been purchased by the Cleveland Southwestern Railway & Light Company, Cleveland, Ohio, following authorization of the purchase by the Ohio Public Utilities Commission on Dec. 12. With this purchase the Southwestern company immediately announced plans to co-ordinate its railway and bus services and schedules and announced the purchase of four new buses of the latest type and design. With the seven old buses taken over from the Elyria company this will give a de luxe bus service running from Cleveland to Elyria and Oberlin and ending at Norwalk.

Subsidy for Kansas City Bus Line Suggested by Public

The Southeast Improvement Association has promised the Kansas City Public Service Company, Kansas City, Mo., 350 passenger fares daily all winter on a bus line on 43d Street if the line is installed. This is 134 more fares than was reported one day recently on the 39th Street line east of Cleveland, the basis upon which the railway estimated only $14 a day in fares could be expected from a 43d Street line. The 350 fares a day would mean $22.25 a day, figuring 6½ cents a fare, transfers considered.

The association suggests that the stub line from 43d Street to 39th Street on Indiana be cut out and the bus be run to 39th Street, either on Indiana or a paved road adjoining. The stub line cars are said to be overcrowded mornings and nights. More than 500 homes have been counted in the district by the association, with four people to a home.

The Kansas City Public Service Company had estimated 200 homes in this district and fixed the net loss on the line from $7,500 to $10,000 a year.

Another Bus Line Acquired by Baltimore Company

The United Railways & Electric Company, Baltimore, Md., has announced that it has taken over the operation of the Lakeland-Baltimore Highlands bus line and that some new buses will be installed on the line. Other improvements are also contemplated.

Would Run Buses in Supplementary Service in South Bend

The Chicago, South Shore & South Bend Railroad has petitioned the Indiana Public Service Commission for authority to operate bus lines within the city of South Bend to supplement interstate railway service between South Bend and Chicago. According to the petition no additional charges would be made for the extended service.

No Safety—No Bus Between Fall River and Quincy

The Eastern Massachusetts Street Railway, which was recently authorized to operate a bus line between the Fall River Ship Yards and Quincy Center, Quincy, Mass., via South Street, has been notified that the State Department of Public Works will not permit buses to operate as proposed because the streets are too narrow and contain too many curves for safety.

Two Losers in Milwaukee Over Bus Competition

At the request of North Milwaukee officials, the Milwaukee Electric Railway & Light Company, Milwaukee, Wis.., is now providing bus service to the western portion of that city, served previously by a competing bus line. The line of the Milwaukee Railway & Light Company, however, connects with the city street cars at a convenient transfer point instead of operating on a parallel route to the downtown business district.

Press reports indicate that the competing bus line, which failed and suspended service, lost heavily from the start. Its routes paralleled those of the

railway in territory where there is not enough business to sustain duplicated service. The railway company also lost some traffic, but it did not reduce its service.

The Milwaukee company feels that this incident illustrates the folly and unfairness of such competition. It has been without redress in instances of this kind in the past, but the new state law, giving the State Railroad Commission power to pass upon the need of new bus routes, in the interest of the public, is expected to prevent unwise and unnecessary establishment of such routes in the future.

Hearings in New York Continued

The New York Transit Commission on Dec. 13 held another hearing on the application of the Equitable Coach Company for a certificate of convenience and necessity for operation of bus routes in Manhattan, Brooklyn and Queens, for which the Board of Estimate has awarded a franchise. Virtually all of the hearing was devoted to cross-examination by Clarence J. Shearn, of counsel for the Brooklyn-Manhattan Transit Corporation, of Alfred J. Doyle, a Board of Transportation engineer, on the necessity for the routes in Brooklyn.

Court Discusses Highway Legislation

United States Supreme Court, in decision just rendered, finds many unadjudicated questions presented in Hammond bus case. Remands case for further examination

IN A decision handed down Nov. 21 the U. S. Supreme Court points out that many points in the control which a city may possess over its streets remain to be determined. These observations were made in the case of the city of Hammond, petitioner, vs. Schappi Bus Line, Inc. The case arose when the city of Hammond, Ind., with about 60,000 inhabitants, passed an ordinance restricting buses from operating over certain of its streets, or from stopping to receive or discharge passengers on certain other streets without receiving permission from the Board of Public Works. It made an exception, however, of the buses of any companies with which the city had an existing contract. The purpose of the ordinance was declared by the city authorities to prevent congestion of traffic and to promote safety.

The Schappi company, which has been operating interstate buses over some of the streets in question, insisted there was no congestion, even in the business district, except such as resulted at times from the passing of railroad trains at grade and from the allowance of unreasonable parking privileges and that the real purpose of the ordinance was to protect from competition another bus company which came under the exception mentioned in the ordinance.

Case Appealed from District Court

The case was first tried in the District Court, which denied the interlocutory injunction asked. This decree was reversed by the Court of Appeals, which, however, did not give the grounds for its decision.

In its consideration of the case, the Supreme Court finds that "the issues of law are as serious and numerous as the questions of fact." It points out the claims of Schappi that the ordinance is in violation of the Indiana statutes and constitution and that it is also void under the Federal Commerce clause and Fourteenth Amendment. The Supreme Court therefore declared the case remanded to the District Court, as it involved questions which it did not feel like passing upon without a discussion of these points by members of the lower courts familar with the local law. In the meantime it directed an injunction pending the suit.

New Questions Involved

An interesting part of the decision are the remarks of the Supreme Court on the novelty of the questions involved. On this point it says:

The contentions made in the briefs and arguments suggest, among other questions, the following: Where there is congestion of city streets sufficient to justify some limitation of the number of motor vehicles to be operated thereon as common carriers, or some prohibition of stops to load or unload passengers, may the limitation or prohibition be applied to some vehicles used wholly or partly in interstate commerce while, at the same time, vehicles of like character, including many that are engaged solely in local, or intrastate, commerce are not subjected thereto? Is the right in the premises to which interstate carriers would otherwise be entitled, affected by the fact that, prior to the establishment of the interstate lines, the city had granted to a local carrier, by contract or franchise, the unlimited right to use all the streets of the city, and that elimination of the interstate vehicles would put an end to the congestion experienced? May the city's right to limit the number of vehicles, and to prohibit stops to load or unload passengers, be exercised in such a way as to allocate streets on which motor traffic is more profitable exclusively to the local lines and to allocate streets on which the traffic is less profitable to the lines engaged wholly, or partly, in interstate commerce? Is limitation of the number of vehicles, or prohibition of stops to load or unload passengers, of carriers engaged wholly, or partly, in interstate commerce, justifiable, where the congestion could be obviated by denying to private carriers existing parking privileges or by curtailing those so enjoyed? Are the rights of the interstate carrier in the premises dependent, in any respect, upon the dates of the establishment of its lines, as compared with the dates of the establishment of the lines of the local carrier?

These questions have not, so far as appears, been considered by either of the lower courts. The facts essential to their determination have not been found by either court. And the evidence in the record is not of such a character that findings could now be made with confidence. The answer denied many of the material allegations of the bill. The evidence consists of the pleadings and affidavits. The pleadings are confusing. The affidavits are silent as to some facts of legal signifiance; lack definiteness as to some matters; and present serious conflicts on issues of facts that may be decisive. For aught that appears, the lower courts may have differed in their decisions solely because they differed as to conclusions of fact. Before any of the questions suggested, which are both novel and of far reaching importance, are passed upon by this court, the facts essential to their decision should be definitely found by the lower courts upon adequate evidence.

On the same day that this decision was handed down the Supreme Court also passed upon a case of the same city of Hammond vs. Farina Bus Line & Transportation Company. While it declared some of the issues in facts and law were different from those in the Schappi case, it was also remanded to the District Court for further proceedings.

Miami Beach Service Increased

A new bus schedule offering increased facilities has gone into effect at Miami Beach following negotiations with the Miami Beach Railway. Five buses of 21-passenger capacity have replaced the three buses of 28-passenger capacity. The new system now in effect covers an increased mileage, totaling 860 miles a day. Transfers are given to any bus line from the street cars, or from bus to bus. The fare is 10 cents within the city, or from any part of the city to Miami.

Approval of Taxi Purchase Terms Sought

The Philadelphia Rapid Transit Company, Philadelphia, Pa., filed application on Dec. 6 with the Public Service Commission in Harrisburg for the acquisition of the Diamond Cab Company and the Cunningham Cab Company. According to the petition the P. R. T. desires to buy 410 shares of stock of the Diamond company and 750 shares of the Cunningham company for $250,000. The P. R. T. already owns the Yellow Cab Company. Brief reference to the plan of the P. R. T. to acquire these properties was made in the Electric Railway Journal issue of Dec. 10, 1927. In support of its petition, the P.R.T. argued that the absorption of the two independent companies by the Yellow Cab Company, now under operation of Mitten Management, Inc., would enable the railway to reduce cruising, thus relieving city-center traffic congestion. The gross earnings of the Cunningham Cab Company were estimated at $200,000 for the first ten months of this year by P.R.T. auditors.

Financial *and* Corporate

Purchase Overtures Resumed

Special counsel for New York Transit Commission says renewal of purchase negotiations with B.-M. T. delays unification plan

RESUMPTION of negotiations with officials of the Brooklyn-Manhattan Transit Corporation for the purchase by the city of the company's elevated lines and its lease and interest in the city-owned subway system is given by Samuel Untermyer, special counsel to the Transit Commission, as the reason for his delay in submitting the unification plan, based on his report of recommendation of Sept. 30 to the commission.

Mr. Untermyer, in a statement made on Dec. 12, disclosed that the company now has experts making a valuation of its properties and on completion of their work the city will know just what the owners of the B.-M.T. will ask for their subway and elevated lines. It is understood, although Mr. Untermyer did not say so, that the company has abandoned its insistence that the city should buy its surface lines.

Mr. Untermyer's statement was in response to repeated inquiries as to how soon submission of the unification plan might be expected. He said:

Owing to the many and complicated questions involved we are still far from a conclusion. What will be the outcome no one can predict. The pivotal point will be, of course, that of the value and selling price of the elevated property.

The Transit Commission's physical valuations have long been in the possession of the companies. We have not received theirs, but physical values are not the ultimate criterion nor the most important element in the problem.

The B.-M. T. has for some time past had its experts at work. Very soon after they have completed their studies we shall know how much these gentlemen will expect for their elevated property. Meantime there are many other aspects equally important which are being and must be further considered.

Progress Not Slow

I realize that progress during the past weeks has seemed slow to the outsider, but that is not the fact. We must ask the public to be patient. It may be that it will all come to naught. I can only say that the outlook is more encouraging.

It would be manifestly undesirable and unwise to put out a plan based on prices fixed by the commission and opposed by the companies with the alternate of recapture so long as there is any hope of avoiding that impass. If these negotiations fail or are too long protracted without making decisive progress, the plan will be put before the commission without further delay.

Later Mr. Untermyer reiterated that recapture would not result in the disruption of the Brooklyn rapid transit service. He said there could be joint operation of recaptured and recapturable lines by order of the commission. Mr. Untermyer added that the only threat to the maintenance of the 5-cent fare was through the inclusion in the readjustment plan of the elevated lines, which he said were losing money, but that it might be well for the city to buy them out of deference to popular opinion. He said:

My judgment that the best interests of the city would be served by recapture and the exclusion of the elevated lines, unless they can be acquired on very moderate terms, is not in the least altered by recent events, I repeat that this can be accomplished without the slightest inconvenience to the traveling public and without a double or increased fare, and that the car riders will in that way secure a vastly improved service and a longer haul.

The only threat to the maintenance of the 5-cent fare is from the inclusion of the elevated lines, both of which are now losing money and would be a still heavier drain if acquired at anything like the inflated prices that have been mentioned. The total cost of both lines on recapture, including all subway equipment, would be about $180,000,000. It would cost more than twice that sum to purchase them.

$18,000,000 Minnesota Issue Approved

The Minnesota Railroad and Warehouse Commission has approved the issue by the Minneapolis Street Railway and the St. Paul City Railway through the parent corporation, the Twin City Rapid Transit Company, of $18,000,000 of 5½ per cent lien and refunding gold bonds, series A, dated Sept. 1, 1927, and maturing in 25 years. The proceeds will refund obligations maturing Aug. 15 and Oct. 1, 1928, to a total of $15,000,000, with capital additions for improvements and extensions. The bonds were offered publicly during the week ended Dec. 10 subject to the approval of their terms by the commission.

$188,016,892 Boston "L" Reproduction Cost

Transportation value of the property fixed by state body at $118,837,253. Governor believes public control without public ownership to be ideal arrangement

BY A unanimous vote the Massachusetts Department of Public Utilities places the reproduction cost of the Boston Elevated Railway at $188,016,892, the transportation value at $118,837,253 and the book value at $109,103,445.

Right-of-way has a book value of $11,435,768 and a reproduction cost of $20,724,294. The largest single item are the cars and buses, with a book value of $16,325,134 and given a reproduction value of $22,761,311, but for transportation purposes, or carrying capacity, the value is fixed at only $14,569,190. Power plant equipment has a book value of $9,099,531 and a reproduction value of $11,434,666, but for transportation purposes this is estimated at only $4,498,342. The book value is the capital stock, bonds and premiums. This is found to be some $9,500,000 less than the transportation value.

The report was ordered by the Legislature. It was made public on Dec. 8 at noon. The document covers four questions:

1. The value for transportation purposes of the property of said company, and whether this value is more or less than the option price provided in Sec. 16 of Chapter 159 of the special acts of 1918.

2. Whether the value of said property for transportation purposes has been increased during the period of public control through expenditures from car fares and other revenue for maintenance, depreciation, reserves or otherwise, and if so, how much.

3. As to the reproduction value of the property of said company and to report its opinion as to the amount thereof, less a proper deduction for depreciation and obsolescence.

4. State its opinion as to the value of the surface lines abandoned by said company.

It has been pointed out that the important figure in the valuation of Boston Elevated property is the reproduction cost, less depreciation, which is $128,937,869. The department finds that to reproduce the road new would cost $188,016,892, but the road is not new so that depreciation of $59,079,023 is deducted to reflect wear and tear of property and equipment, etc. Stress is laid by one of the commentators as the fact that reproduction cost is a matter of only academic interest inasmuch as the state has an option to buy the road at a lower figure. However, it is of some value to the stockholders to know that their property, which is carried on the books at $109,000,000, would cost approximately $129,000,000 to reproduce. In fact, as the road carries a depreciation reserve of about $8,200,000, the excess appraised value is not $20,000,000 but $28,200,000.

It was provided in the public control act that the Commonwealth might buy the Elevated road for a price which, although not stated in the act, is found by the Department of Public Utilities to be a little more than $109,000,000. Assuming that the holders of the first and second preferred stocks exercised their right of conversion into common, and that the $3,000,000 so-called third preferred was called at 105, this price would work out about $111 a share for

the common. Consequently, as the state can buy the road at a figure which would give the common stockholders $111 a share, it makes no particular difference how much more than book figures the property may be found to be worth except of course in the unlikely contingency of return to private management. In that event the value of the property becomes all-important.

On Dec. 31, 1926, according to the Boston Elevated balance sheet, the book value of the $23,879,400 common stock was about $119 a share. This is after allowing par for the first and second preferred stocks which they would receive in liquidation unless converted into common, and is also after taking out $105 a share, the redemption price of the $3,000,000 so-called third preferred. The reproduction cost being $20,000,000 larger than the gross amount at which the road carries its property on its books, and $28,200,000 larger than the net amount, after depreciation, it follows that the book value is increased in the first instance to $202 a share and in the second instance to $237 a share. In other words, if the road were to substitute this $129,000,000 reproduction cost for its own valuation of $109,000,000, less $8,200,000 depreciation, the result would be a book value of $237 a share for the common. As already indicated, however, these calculations are essentially academic with the state holding an option to buy the property for $109,000,000.

Governor Fuller has made known that he is opposed to any plan for the exercise of the right of the state to take over the road. He believes the situation is one which gives the state a distinct advantage, but that the solution of the Elevated problem is in a continuance of public control, without public ownership, to which there are "good and valid objections." He will not recommend any specific bill to the General Court, but he will submit suggestions which he believes will go far toward settling the problem. On Dec. 8 he stated his opposition to any plan which would mean the return of the road to the control of its private owners, or which, on the other hand, would bring about public ownership. He said:

> I believe that in the public control of the road, without the objections of public ownership, we have the ideal situation, and if a plan is devised whereby the road can be relieved of some of the burdens which have been placed upon it, there is no reason why this situation cannot be continued, with equal justice to the stockholders and to the public.

The Governor would not say for what period of years he would favor the continuance of public control, but indicated that it might be left to run indefinitely without any fixed period being specified. He said he would be slow in proposing any long period of continuance because the future must always be uncertain. As to the rate of dividends which should be continued to stockholders, the Governor was noncommittal, but he said he believed the dividend question could be worked out satisfactorily to both stockholders and the public.

On April 26, 1927, the Massachusetts House ordered that as an aid in determining the disposition to be made of the Boston Elevated Railway and its property, including the question of extending or terminating public control, the Department of Public Utilities be directed to investigate the value for transportation purposes of the property of the company, and whether this value was more or less than the option price provided in Section 16 of Chapter 159 of the special acts of 1918, and also whether the value of the property for transportation purposes has been increased during the period of public control through expenditures from carfares and other revenue for maintenance, depreciation reserves or otherwise, and if so, how much. The department was also directed to investigate as to the reproduction value of the property of the company and to report its opinion as to the amount thereof, less a proper deduction for depreciation and obsolescence. It was also to state its opinion as to the value of the surface lines abandoned by the company.

Changes in Kansas City Board of Directors

J. K. Newman, large owner of the stock of the Kansas City Public Service Company, Kansas City, Mo., resigned Dec. 5 as a member of the board of directors at the first formal meeting of that body. His resignation is in line with his plan to place the street railway properties there under a local board of directors. His place will be filled by George G. Morris, trainman, who has been selected for the place by a vote of all the employees of the company.

The board is now composed of Peter W. Goebel, chairman; Herbert M. Woolf, James K. Chandler, Powell C. Groner, president; Carl W. Allendoerfer; Henry N. Ess; Charles Howell, Dr. Paul H. Saunders, E. M. Stayton; Henry Hanssen, Mr. Morris. Dr. Saunders is the only out-of-Kansas City member, his home being in New Orleans. He is a member of the Newman-Saunders banking firm. A budget for the coming year was placed before the board by Mr. Groner. It called for expenditures of about $3,000,000 next year.

Dissolution of Vancouver, Wash., Company Asked

A petition for an order permitting the Clark County Development Company, Vancouver, Wash., to dissolve the corporation, which was organized June 19, 1909, was filed in that city Dec. 2. This corporation operated the Vancouver street and interurban railway up to Nov. 1, 1926, when this railway was abandoned by the City Council. Thus since that time the organization has had no business to pursue. The territory in which the railway operated is now served by the Vancouver Bus Company.

Warsaw Line Would Issue Bonds

The Winona Railroad, operating between Peru and Goshen, Ind., has petitioned the Public Service Commission for authority to issue $260,000 in 6 per cent bonds. This money is desired to reimburse the company for capital expenditures since June, 1924.

Reasons for California Deal Explained

Further facts are available regarding the negotiations for the sale of the Petaluma & Santa Rosa Railroad, Petaluma, Cal., to the Southern Pacific and the Santa Fe Railroads acting jointly, to which brief reference was made in the Electric Railway Journal for Dec. 3, page 1042. While the companies mentioned own the Northwestern Pacific Railroad, the purchase of the Petaluma & Santa Rosa Railroad by them will not mean consolidation of the two lines, as they will continue to be operated independently. There will be no change in the management or policy of the Petaluma & Santa Rosa Railroad.

An officer of the electric railway in explaining the proposed deal made it plain to the public that the sale will simply mean a change in stock ownership, which will enable the electric railway to expand its business. It now serves, under traffic arrangements, as a feeder to both the Southern Pacific and the Santa Fe lines, and purchase by these companies will have the effect of extending these arrangements, placing them on a more permanent basis whereby more traffic can be developed.

Port Arthur Sale Date Set

Sale of the electric railway system of the Port Arthur Traction Company, Port Arthur, Tex., has been ordered by Judge W. Lee Estes of the United States District Court at Beaumont, upon petition of the Dayton Savings & Trust Company of Dayton, Ohio, for foreclosure of mortgage against the company. The date has been set for Jan. 10.

Suit for the foreclosure of mortgages amounting to $324,000 and asking the sale of the public utility was filed in the United States District Court Nov. 14. According to the petition the railway is "deteriorating so fast that it ceased to be a safe investment for its creditors."

In April, 1917, the officers of the Port Arthur Traction Company issued $400,000 in bonds for improvements and extensions and for operation and maintenance. The plaintiff alleged that only $9,000 of the original issue has been paid off and that three semi-annual allotments of interest have lapsed. In July, 1926; in January, 1927, and in July, 1927, the defendant failed to pay $8,100 interest for the semi-annual period, it is alleged. The outstanding bonds are the only indebtedness secured by lien against the company.

It is understood that the Gulf States Utility Company will enter a bid when the railway is offered at public auction.

Earnings in Youngstown Less Than Allowed Return

Including the 7 per cent return allowed on the capital investment, the Youngstown Municipal Railway, Youngstown, Ohio, operated during October at a loss of $32,505 according to Traction Commissioner Harry Engle.

This is the fourth consecutive month that the company received no return on its investment. The loss, however, is smaller than in September, when it was $37,748. The deficit for August was $27,280 and for July $27,203. Under the franchise the company was entitled to a return of $26,726.

Gross revenue for October, this year, was $158,346, compared with $176,924 for the corresponding month last year. The total mileage, including bus and railway, for October, 1927, was 477,301, compared with 483,085 for the similar month of last year. Mr. Engle's report places the total deficit in the stabilizing fund at the end of the month at $1,647,667. The earnings per car-mile are given at 32 cents and the actual cost of service at 38 cents.

1 Per Cent Bonus on Ottawa Traction Stock

The Ottawa Traction Company, Ottawa, Ont., has declared a bonus of 1 per cent on the capital stock in addition to the regular quarterly dividend of 1 per cent, both payable on Jan. 3 to stock of record Dec. 15.

Binghamton Sale Postponed

Sale of the properties of the Binghamton Railway, Binghamton, N. Y., under foreclosure set for Dec. 1, 1927, was postponed to Jan. 5, 1928. The railroad proper consists of 47.72 miles of single and double track and the equipment consists of seventeen buses and 79 cars, all in good condition.

Abandonment Sought in New Mexico

A petition was recently presented to the New Mexico Corporation Commission by the Las Vegas Transit Company seeking permission to abandon the line because of operating losses. The line operates between east and west Las Vegas, N. M The two municipalities have already approved the proposed suspension.

Pence Interests Get Minnesota Roads

H. E. Pence, president of the Minneapolis, Northfield & Southern Railway, Minneapolis, Minn., has secured control of the Minnesota Western and the Electric Short Line Terminal Company. The assets of the companies involved are put at $4,000,000. The companies will be operated separately under the management of the Minneapolis Southern. This gives the Pence line a fine electric terminal in the city, which is entered also by the Anoka electric line. The first two named roads operate gas-electric passenger trains and steam freight. They both enter the electric terminal at Third Avenue North and Seventh Street. The first line covers 127 miles and the second 116 miles to Gluek, Minn., a new station.

Verity of Commission's Valuation Not Considered in O'Fallon Case

A court specially constituted to try the issues has sustained the ruling of the Interstate Commerce Commission in the so-called St. Louis & O'Fallon Railroad recapture case. The Supreme Court of the United States will hear the appeal. The importance of the final result of the litigation may be judged by the finding of the commission that the 1914 base, which was the one the commission with certain allowances adopted by a majority opinion, gave in 1920 a value of $18,900,000,000 for all railroad properties in the United States, while the reproduction cost basis made it $41,400,000,000 in 1920 and took it back to $31,300,000,000 in 1923.

In his decision, Federal Judge Kimbrough Stone says the order of the Interstate Commerce Commission should be modified to allow interest on each of the amounts due found by the court only from June 17, 1927, and as thus modified should be sustained.

The concurrent opinion, written by District Judge Charles B. Faris, says:

In conclusion, I am not convinced that the commission erred, but am of the opinion that it reached the valuation found by it in the only way possible in a situation so difficult as that absolute certainty and correctness were well nigh finitely impossible. Therefore I concur in the result.

Judge Stone in his opinion did not touch upon the question of valuation, but Judge Faris in his opinion said:

Therefore the value of the physical property of the common carriers under the recapture provision of the interstate commerce act ought to be the result of expert opinion, reasonably and honestly exercised and informed by a consideration of the information required by statute to be obtained; as is to be deduced from a fair analysis of the items considered and of the method employed in the valuation; and should, in addition to the use in the valuation of the statutory information, take into consideration the average of known price levels for both labor and materials over a fair term of years preceding the valuation as well as for a fair term of years thereafter, based on the trend of such levels according to historical observation and human experience.

The original opinion was written by Judge Stone and the concurring opinion was prepared by Judge Faris.

In the St. Louis & O'Fallon Railroad case the commission was divided five to four. The language of the dissenters was more bitter than the protest of the railroads. Commissioner Thomas F. Woodlock of New York declared that the law of the land was summarily set aside by the majority. The Supreme Court is composed now as it was when it decided the case of McCardle vs. Indianapolis Water Company. The essence of that decision was that value should be found as at the time of the inquiry.

The opinion of the Interstate Commerce Commission on entering its decision said:

We are dealing here with one small railroad. Nevertheless, what we do in this case we must in principle do for all the railroads in the United States. Whatever our decision, its effects in dollars and cents is relatively unimportant in this particular case. There is here presented, in reality, a great national problem affecting public policy and welfare in a most profound way . . . We must carefully review the significance to the nation of the decision which we make in this case in its bearing on the relation between all railroads and the people of the United States. It may well be that the valuation of railroads on a national scale requires the beginning of a new chapter in valuation.

Vote on Increase in P. R. T. Preferred Stock Scheduled

A special meeting of the stockholders of the Philadelphia Rapid Transit Company, Philadelphia, Pa., will be held on Feb. 6 to vote on the proposed increase of $7,000,000 in preferred stock, which will make $30,000,000 preferred outstanding.

Committee Representing Omaha Holders Reviews Affairs

Affairs of the Omaha & Council Bluffs Street Railway, Omaha, Neb., have been reviewed in part as follows in a circular by the protective committee of bondholders:

As a result of careful and impartial study of the situation, the following effective measures have been or are being taken for the protection of the bondholders, viz., John N. Shannahan, an experienced railway operator, was made president of the company; (2) the financing of the Omaha & Council Bluffs Railway & Bridge Company, thus preserving the equity in this company for the benefit of the railroad company bondholders; (3) the election of representative business men of Omaha to the board; (4) agreement with the company providing (a) that no dividend shall be paid during the period of extension and (b) for the cancellation or deposit as security of the $1,005,000 bonds now held in the treasury of the company, and (5) to insure the maintenance in office of a satisfactory board of directors during the period of extension.

It is our belief that the above features greatly strengthen the position of the bondholders and that their interests will be fully and adequately protected by the committee, of which Sidney W. Noyes is chairman. We believe the proposed extension of the bonds is the only practical course for the bondholders and we therefore strongly recommend that you deposit your bonds immediately. In view of the measures adopted for the protection of bondholders, our committee will now disband and representatives of our committee will accept membership on the committee requesting deposits.

Personal Items

J. F. Lumsden New Manager of Nova Scotia Property

On the first day of the new year J. F. Lumsden will take over the management of the Nova Scotia Tramways & Power Company, Halifax, N. S. To carry out this assignment he will resign as assistant chief engineer of the Nova Scotia Power Commission, with which body he became affiliated in 1921 as chief electrical engineer.

Mr. Lumsden was first employed with the Canadian General Electric Company as an apprentice in its factory and on its engineering staff from 1911 to 1915. Early in the latter year and up to July, 1916, he served on the operating staff of the Winnipeg Electric Railway. After his overseas service with Canadian Expeditionary Forces he returned to Halifax in 1919 and took a position as professor in electrical engineering at the Nova Scotia Technical College. Two years later he went with the Nova Scotia Power Commission.

The manager-elect was born in Trinity, Newfoundland. Early in his life he moved to Nova Scotia, where he attended the high school in Yarmouth and later the Mount Allison University and the Nova Scotia Technical College. He was graduated from the latter institution with the degree of bachelor of science in electrical engineering in 1911.

W. J. Tharp Retires from Railway Work

W. J. Tharp, affiliated with the electric railway properties in Little Rock, Ark., for more than 28 years, resigned recently to become an official of Kaufman & Baer, a large department store organization in Pittsburgh. For many years Mr. Tharp was a director of the Arkansas Central Power Company and secretary of the Arkansas Utilities Association. He also served on utility association special committees. When Mr. Tharp became affiliated with the Little Rock property the system owned twelve cars and the mileage was about half what it is today. At present there are 65 cars in regular service running over 42 miles of track.

M. N. Baker Honored

M. N. Baker, associate editor of *Engineering News-Record*, was the guest of honor at a dinner given by about 100 of his associates in the McGraw-Hill company at the Engineers Club, New York City, Dec. 9, in celebration of his 40th year of continuous editorial service with *Engineering News* and *Engineering News-Record*.

Mr. Baker started in engineering journalism with *Engineering News* when Arthur M. Wellington was editor. One of his first achievements was the building up of a water-works year book, the Manual of American Water-Works, which long was a basic source of information regarding the water-works of the United States and Canada. Out of this year book grew Mr. Baker's special and editorial attention to questions of water purification, sewage and garbage disposal and other phases of public health and sanitation which were then beginning to be put on a scientific basis. He is the author of several standard engineering works.

H. L. Mitchell Honored

H. L. Mitchell, president of the West Penn Railways, Pittsburgh, Pa., was chosen to continue as president of the Pennsylvania Street Railway Association at the close of the session on Dec. 2, in Scranton, Pa. He succeeds the late Jilson J. Coleman.



H. L. Mitchell

This railway executive has been identified with the West Penn Railways and the companies which it controls for the past 25 years. During this time the property has developed into one of the most important utility systems in Pennsylvania operating railway and bus lines in the western part of that state, eastern Ohio and northern West Virginia.

Mr. Mitchell entered the employ of the old Pittsburgh, McKeesport & Connellsville Railway at Pittsburgh on March 1, 1902. Less than a year later, when the general offices of the road were moved to Connellsville, he became chief clerk to Thomas Elliot, at that time general manager. From that time until July 1, 1911, he held various positions with the company, among them those of paymaster and office manager. He also had charge of the general and district stores department.

When the West Penn System acquired additional property in Allegheny, Buffalo, Armstrong, Washington and Green Counties Mr. Mitchell was transferred to Pittsburgh as assistant to W. E. Moore, vice-president and general manager. Several years later, when the system was reorganized, he was made assistant manager of the light and power department, and in 1918 he entered the office of Williston Fish as an assistant to the vice-president. A few months later he was transferred to the Wheeling Traction Company, and on Feb. 1, 1919, returned to Pittsburgh as general manager of the West Penn Railways. Nor were his honors to stop with this promotion. He was elected vice-president on March 1, 1920, and president April 14, 1927.

Engineer Hewes Resigns from Rensselaer Property

James E. Hewes, vice-president and general manager of the Eastern New York Utilities Company, Rensselaer, N. Y., will resign Jan. 1 to specialize in the investigation of the engineering and operation of public utilities. Mr. Hewes, widely known as an engineering expert, went to the Albany Southern Railroad in 1909 in an advisory capacity soon after that company was brought out of receivership. He was appointed vice-president and general manager thirteen years ago and since that time has been the directing head of the railroad, the gas and the electric departments of the company.

In 1922 the company was succeeded by the Eastern New York Utilities Company and Mr. Hewes remained the active head of the company. Prior to his going to Albany, he was for five years assistant to the vice-president in charge of operations for H. M. Byllesby & Company, Chicago, operators and owners of public utilities. The property which Mr. Hewes leaves was merged recently with the newly formed New York Power & Light Corporation.

Because he had seen an opportunity to broaden his field of activity was the reason given by Mr. Hewes for his resignation. He plans to enter his new work when he returns from a month's vacation in Cuba.

W. H. Munro has resigned as manager of the Nova Scotia Tramways & Power Company, Halifax, Nova Scotia. He will be succeeded by J. F. Lumsden.

Charles A. Brann has resigned as superintendent of the Eastern Texas Electric Company, Beaumont, Tex. He will be located at Navasota, Tex., in charge of properties in more than a score of communities in which the Western Public Service Company operates.

J. McLucius Snellings was made general freight agent of the Augusta-Aiken Railway & Electric Corporation, Augusta, Ga., effective Sept. 1, 1927. Mr. Snellings became affiliated with the corporation as a conductor on the City Division, July, 1915, and on Oct. 1, 1916, was promoted to assistant claim agent and chief clerk of the railway department. He was given the additional duties of chief dispatcher on Feb. 18, 1924. He was also secretary of the safety organization.

Manufactures *and the* Markets

Twelve New Cars for Washington Railway

Twelve new cars, at an estimated cost of more than $174,600, have been ordered by the Washington Railway & Electric Company, Washington, D. C., from the J. G. Brill Company, according to recent advices from the company. In addition the company is equipping 41 double-truck, one-man cars with National Pneumatic Company's automatic rear exit doors and brake interlocks. With this interlocking equipment brakes cannot be released and current cannot be applied to the motors until the rear exit door and step are closed. As the cars go through the shop they are being painted royal blue and cream, with gilt lettering on the outside, and on the inside the woodwork is being painted with a light gray enamel and the headlining with white enamel. The estimated cost of this work is a little more than $47,000.

The order for the new cars and the changes in others were the outcome of an order issued by the Public Utilities Commission of the District of Columbia Sept. 8, 1927, in which it was stated that "the commission is of the opinion that as a general principle one-man cars not equipped with automatic treadle rear exits and double front doors, to permit of simultaneous entrance and exit, do not and cannot give satisfactory service for the city of Washington, D. C."

In accordance with this opinion the company agreed to equip the 41 one-man cars with automatic treadle rear exits and double front doors. At the same time it also agreed to retire from service twelve of the oldest type of one-man cars not capable of being so equipped and to replace them with an equal number of new cars of the type now in use on Wisconsin Avenue.

Let-Up in Demand Affects Metal Prices

Copper and zinc have been extremely quiet in the week ended Dec. 14. There has been some activity in lead, but the total volume of business has declined. Tin has been in fair demand.

The week ended Dec. 14 has been one of the quietest of the year so far as copper is concerned. Most of the larger producers have held throughout the week at 14⅛ cents delivered in the East and 14¼ cents in the Middle West. Copper appeared on the market as early as Saturday, however, at 14 cents delivered in the East. Foreign demand has been quiet, with the export association's price unchanged at 14.50 cents, c.i.f.

Zinc prices have gradually weakened from the level of a week ago, the net decline for the week being about ⅛ cent. Sales have been very small. On Dec. 13 and 14 the market was 5.70 cents, St. Louis, for December and 5.725 cents for January and February, though several producers refused to quote at these levels.

Lead buying has been in considerably smaller volume than during the preceding week, but aside from some slight tendency in the Middle West to shade prices in order to attract buyers, quotations are unchanged. The lead available at 6.325 cents or even 6.30 cents in the St. Louis market is for the most part for December delivery, the January position being the firmer of the two.

Consumers have been buying tin in the domestic market more actively than for several weeks, and the price has ruled close to 58.625 cents for prompt Straits, with little or no difference for forward positions.

Railway Traffic Accommodated Over Akron Viaduct

The new Exchange Street viaduct in Akron, Ohio, costing approximately $2,000,000, has been opened for railway traffic. The viaduct will not be ready for general use by the public until early next year. It spans all of the trunk line railroads entering the city and is adjacent to the site of the new Union Station, which is to be started in 1928 and built at a cost of approximately $4,000,000. The companies constructing the viaduct are the Northern Ohio Power & Light Company, Baltimore & Ohio Railroad, Erie Railroad and Pennsylvania Railroad. The city also pays its proportion. This viaduct, it is reported, is the first step in the complete grade elimination program in the city.

Queens Subway Contract Awarded

The first contract in the Borough of Queens for the construction of part of New York City's new subway system was awarded on Dec. 13 by the Board of Transportation to the Atwell-Custon-Morris Company at the bid price of $5,198,283, the lowest of twenty bids received. The contract is for a section 1 mile long. Its construction will serve to connect the Queens Boulevard-Jamaica subway and the Brooklyn crosstown subway, still to be built, with the 53d Street tunnel line from Manhattan. Completion of the section is stipulated within three years from the date of delivery of the contract. This is the 33d major contract of the new subway system to be awarded and brings the total awards to $171,595,561.

The board will receive bids for the construction of two more sections of the Brooklyn crosstown subway this month. On Dec. 30 it will receive bids for the section in Manhattan Avenue from Nassau Avenue to Green Street, and on Dec. 31 for the section in Greenpoint to Arch Street, Long Island City.

Carhouse of Ohio Road Burned

Fire of undetermined origin destroyed the carhouse of the Columbus, Delaware & Marion Electric Company at Stratford, 3 miles south of Delaware, Ohio, on Dec. 15, the loss being estimated at several hundred thousand dollars.

ELECTRIC RAILWAY MATERIAL PRICES—DEC. 13, 1927

Metals—New York

Copper, electrolytic, cents per lb.	13.850
Lead, cents per lb.	6.50
Nickel, cents per lb.	35.00
Zinc, cents per lb.	6.0625
Tin, Straits, cents per lb.	58.625
Aluminum, 98 or 99 per cent, cents per lb.	25.00
Babbitt metal, warehouse, cents per lb.:	
Commercial grade	61.00
General service	31.50

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$4.075
Somerset mine run, Boston	1.90
Pittsburgh mine run, Pittsburgh	1.825
Franklin, Ill., screenings, Chicago	1.60
Central, Ill., screenings, Chicago	1.50
Kansas screenings, Kansas City	2.175

Track Materials—Pittsburgh

Standard steel rails, gross ton	$43.00
Railroad spikes, drive, ⅝ in. and larger, cents per lb.	2.80
Tie plates (flat type), cents per lb.	2.25
Angle bars, cents per lb.	2.75
Rail bolts and nuts, cents per lb.	3.90
Steel bars, cents per lb.	1.80
Ties, white oak, Chicago, 6 in.x8 in.x8 ft.	$1.45

Hardware—Pittsburgh

Wire nails, base per keg	2.50
Sheet iron (24 gage), cents per lb.	2.75
Sheet iron, galvanized (24 gage), cents per lb.	3.60
Galvanized barbed wire, cents per lb.	3.20
Galvanized wire, ordinary, cents per lb.	2.40

Waste—New York

Waste, wool, cents per lb.	16–20
Waste, cotton (100 lb. bale), cents per lb.:	
White	16–19.50
Colored	11-16

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), cents per lb.	10.6
White lead in oil (100 lb. keg), cents per lb.	13.25
Turpentine (bbl. lots), per gal.	$0.59
Putty, 100 lb. tins, cents per lb.	5.25–5.50

Wire—New York

Copper wire, cents per lb.	15.125
Rubber-covered wire, No. 14, per 1,000 ft.	5.50
Weatherproof wire base, cents per lb.	15.75

Paving Materials

Paving stone, granite, 5 in. New York—Grade 1, per thousand	$150
Wood block paving 3½, 16 lb. treatment, N. Y., per sq.yd.	$2.70
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots	51.00
Paving brick 3x8½x4, N. Y., per 1,000 in carload lots	45.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd.	1.85
Cement, Chicago consumers' net prices, without bags	2.05
Gravel, ¾-in., cu.yd., f.o.b. N. Y.	1.75
Sand, cu.yd., f.o.b. N. Y.	1.00

Old Metals—New York and Chicago

Heavy copper, cents per lb.	11.375
Light copper, cents per lb.	9.875
Heavy yellow brass, cents per lb.	7.375
Zinc, old scrap, cents per lb.	3.625
Lead, cents per lb. (heavy)	5.375
Steel car axles, Chicago, net ton	$15.75
Cast iron car wheels, Chicago, gross ton	13 75
Rails (short), Chicago, gross ton	14.75
Rails (relaying), Chicago, gross ton (65 lb. and heavier)	28.50
Machine turnings, Chicago, gross ton	7.75

First Home-Built Car Exhibited by St. Louis Railway



Side elevation of the 50 St. Louis units. They are of the front-entrance, side-exit type and are adaptable to one-man operation



Rear view of interior of the 50 new units which are now being turned out from a shop of the Public Service Company of St. Louis

CAR No. 1301, the first of 50 new units now being built by the St. Louis Public Service Company of St. Louis, Mo., at a cost of $10,500 each, was placed on public exhibition at Twelfth Boulevard and Olive Street recently. The units are to be of the front-entrance side-exit type which originated with car No. 700.

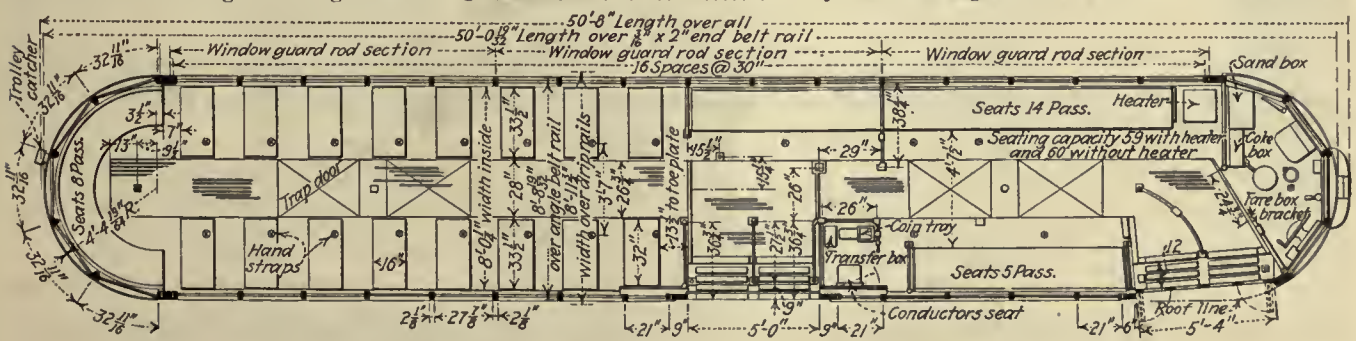
Among other things the specifications call for a slight incline to the floor from the front entrance to the conductor's stand; narrower grooves in the flooring to obviate the danger to high heeled feminine passengers; elimination of screen behind the motorman's stool to increase vision and ventilation; readily adjustable window sashes of metal and better door signal lights for the motorman. The seat upholstery is of cane.

The orange coloring so familiar to street car riders of St. Louis, but of a shade darker than now in use, has been chosen for the lower portions of the units, while the upper sections are finished in a rich cream color. The inside painting will consist of cream ceilings that reflect the light and contrasts effectively with the interior cherry trim.

Following are specifications released by R. J. Lockwood, assistant manager of the company:

SPECIFICATIONS OF ST. LOUIS' HOME-BUILT CAR

Name of railway	St. Louis Public Service Co.
City and state	St. Louis, Mo.
Number of units	50
Type of unit	One-man, two-man, motor, passenger, city, single-end, double-truck
Number of seats	60
Builder of car body	United Rwys. of St. Louis
City and state	St. Louis, Mo.
Delivery	15 per month
Weights:	
Car body	20,986 lb.
Trucks	10,414 lb.
Equipment	8,000 lb.
Total	39,400 lb.
Bolster centers	24 ft. 6 in.
Length over all	50 ft. 8 in.
Truck wheelbase	5 ft. 4 in.
Width over all	8 ft. 11¼ in.
Height, rail to trolley base	11 ft. 11 in.
Window post spacing	30 in.
Body	Semi-steel
Roof	Arch
Air brakes	Westinghouse variable load straight air
Armature bearings	Plain
Axles	3½ x 7 M.C.B. journal
Car signal system	Faraday
Compressors	Westinghouse D.H-16
Conduit	Metal
Control	K-75
Curtain fixtures	Curtain Supply Co.
Curtain material	Wyndasote
Destination signs	Hunter
Door mechanism	National Pneumatic Co.
Doors	Folding front, sliding center
Energy-saving device	Economy
Fare boxes	Johnson
Gears and pinions	Westinghouse spur
Glass	D.S.B.
Hand brakes	Peacock
Hand straps	Central Equipment Co.
Heaters	Peter Smith hot air
Headlights	Imperial incandescent, Crouse-Hinds
Headlining	Agasote, Pantasote Co.
Interior trim	Cherry
Journal bearings	Plain, 3½ in. x 7 in.
Journal boxes	A.E.R.A. type with thrust plate
Lamp fixtures	General Electric
Motors	Westinghouse No. 510-E, inside hung
Painting scheme	Orange, chrome and cream enamel
Registers	Security
Roof material	Treated canvas
Sash fixtures	O. M. Edwards Co.
Seats	St. Louis Car Co.
Seat spacing	30 in.
Seating material	Cane
Steps	Stationary
Step treads	Feralun
Trolley catchers	Ohio Brass
Trolley base	Nuttall U. S. No. 20-A
Trolley wheels	Railway
Trucks	Commonwealth Steel Co.
Ventilators	Globe
Wheels, type	Chilled iron, 26 in. diameter
Wheelguards or fenders	Company make



General dimensions and seating plan of 50 units for Public Service Company of St. Louis

Receiver Named for the Galena-Signal Oil of Texas

On the application of the Galena-Signal Oil Company, Franklin, Pa., Judge Monteith in the 61st District Court appointed McDonald Meachum of Houston, Tex., receiver Dec. 8 of the Galena-Signal Oil Company of Texas, whose refinery and principal properties are in Houston. The Houston company is a subsidiary of the Pennsylvania company. The Fidelity Trust Company, Houston, is made a party to the suit because it is the trustee for the bondholders. M. J. A. Bertin, president of the Pennsylvania company, said the action had been rendered necessary by the depressed state of the oil business throughout the country. He stated that "although the Galena-Signal Oil Company of Pennsylvania, through ownership of capital stock of the Galena-Signal Oil Company of Texas, has a considerable investment in the latter company, the operations of the two companies has been along distinctly different lines and the receivership in no way affects the operating program of the Pennsylvania company, which will continue, as in the past, along lines of specialization in the field of railway transportation and mechanical lubrication."

Twenty Rapid Transit Cars for Hudson & Manhattan

Specifications have been released for the twenty rapid transit motor cars ordered on Nov. 17 by the Hudson & Manhattan Railroad, New York, from the American Car & Foundry Company, New York, and which were mentioned in the issue of the JOURNAL for Dec. 3. The cars will have an over-all length of 51 ft., total weight of 74,000 lb., a seating capacity for 44 passengers, and will be of all-steel construction. The exterior color of the cars will be Pullman green. Specifications released by T. G. Anthony, assistant to president Hudson & Manhattan Railroad, follow:

Name of railway	Hudson & Manhattan Railroad
City and State	New York, N. Y.
Number of units	20
Type of car	Multiple unit, motor, passenger, interurban, double-end, double-truck
Number of seats	44
Builder of car body	American Car & Foundry Co., New York City
Date of order	Nov. 17, 1927
Weights:	
Car body	35,100 lb.
Trucks	24,340 lb.
Equipment	14,560 lb.
Total	74,000 lb.
Bolster centers	33 ft. 0 in.
Length over all	51 ft. 0 in.
Truck wheelbase	6 ft. 6 in.
Width over all	8 ft. 11 in.
Height, rail to trolley base	11 ft. 9 in.
Body	All steel
Roof	Monitor
Doors	Center and end
Air brakes	Westinghouse
Armature bearings	Plain
Axles	Heat treated
Car signal system	National Pneumatic
Compressors	Westinghouse
Conduit	Metal
Control	General Electric PC
Couplers	Van Dorn
Destination signs	Hunter
Door mechanism	Pneumatic
Doors	Sliding
Finish	Semi-enamel
Floor covering	Magnesite
Gears and pinions	Heat treated
Glass	Plate
Hand brakes	Adams-Westlake
Headlining	Steel
Interior trim	Steel
Journal bearings	Plain
Journal boxes	Symington
Lamp fixtures	Special
Motors	Two General Electric, No. 259A, inside hung
Painting scheme	Pullman green
Roof type	Monitor
Roof material	Steel
Sash fixtures	Brass
Seating material	Rattan
Slack adjusters	Westinghouse
Trucks	A. C. & F.
Ventilators	Perry
Wheels, type	Steel tired, 30- and 33-in. diameter

ROLLING STOCK

CLEVELAND SOUTHWESTERN RAILWAY & LIGHT COMPANY, Cleveland, Ohio, has announced the purchase of four new buses in furtherance of its plan to coordinate railway and bus service. These buses, of the latest type and design, consist of White motors and chassis with Bender bodies. They are of battleship gray with nickel-trimmed rear and spacious observation platforms. In addition each seat has individual lighting. Each bus is equipped with non-shatterable glass.

BOSTON ELEVATED RAILWAY, Boston, Mass., has recently ordered a White six-cylinder bus, Model 54.

ALABAMA POWER COMPANY, Birmingham, Ala., reported recently that it was buying two center-entrance type cars from the South Carolina Power Company, Charleston, S. C., for the Gadsen street railway system. The plan was to remodel the bodies in order to provide front entrances and to equip the center doors with treadle devices so they could be used as exits. These double-truck cars are modern in every way and are to replace obsolete equipment in operation in Gadsen.

COUNTY TRANSPORTATION COMPANY, bus operating subsidiary of the New York, Westchester & Boston Railway, has accepted delivery on eighteen 29-passenger Mack city type buses, AB model, four-cylinder, 225-in. wheelbase. This delivery brings the total fleet to 50 Macks.

TRACK AND LINE

TULSA STREET RAILWAY, Tulsa, Okla., has started a $75,000 improvement program. Removal of all joints in the tracks through a process of thermit welding is planned. Twelve miles of track will he relaid and 6 miles will undergo minor improvements. All trackwork is being done between midnight and 6 a.m., while tracks are free from use.

SHOPS AND BUILDINGS

WISCONSIN POWER & LIGHT COMPANY, Madison, Wis., is reported, as proposing a union bus terminal for Madison. The company has purchased property, at a cost of about $150,000, in the heart of the downtown business district, recent advices state, on which it proposes to erect early next year a ten-story office building with an adjoining two-story bus terminal. Tentative plans for both structures have been drawn by architects.

PHILADELPHIA RAPID TRANSIT COMPANY, Philadelphia, Pa., in submitting its financial program for 1928 to the Council, has included liberal allowances for expenditures to various departments. On general shop enlargement and increasing maintenance facilities, the communication stated the sum of $2,000,000 is to be spent. These improvements will affect electric substation equipment. In addition, $175,000 is to be expended on the substation at Third Street and Wyoming Avenue, $450,000 on the substation at 33d and Market Streets and $66,000 on additional rotary-Letterley substations.

ADVERTISING LITERATURE

OHIO BRASS COMPANY, Mansfield, Ohio, has recently published a booklet entitled "Lead Tip Steel Pins for Insulators." The booklet contains sixteen pages in colors with an artistic cover. It treats of the importance of the pin to the insulator, placing particular emphasis on the necessity for proper pin selection to provide the most efficient insulator service. O-B pins, according to the publication, are all knurled and hot dipped galvanized before the lead is specially applied to insure a permanent bond so that the lead does not come loose on the pin. The booklet also describes and lists other O-B products and may be had upon request.

ECONOMY ELECTRIC DEVICES COMPANY, Chicago, Ill., is distributing a reprint of a double-page advertisement of its electric railway and gasoline vehicle meters which appeared in the ELECTRIC RAILWAY JOURNAL of Oct. 8.

CONDIT ELECTRICAL MANUFACTURING CORPORATION, Boston, Mass., has issued a mailing folder descriptive of its switchboards, in which it emphasizes the careful testing they undergo and that "they must be correct to the last detail.

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, East Pittsburgh, Pa., has issued circular 1793 in booklet form devoted to a discussion of the application of automatic switching to railway use. The circular is entitled Automatic Railway Substations. It is illustrated and is divided into six sections. They advise that the circular may be obtained at any of the district offices of the Westinghouse company or at the advertising division at East Pittsburgh, Pa.

ALEXANDER MILBURN COMPANY, Baltimore, Md., is mailing looseleaf bulletins B-200 C and B-200 D, illustrating and describing its acetylene generators and its die burners and preheaters.

GENERAL ELECTRIC COMPANY, Schenectady, N. Y., has issued an attractive folder, GEK-37, describing its gas-electric drive for buses.

Delivery of Detroit Cars Will Begin in October

Delivery of the 125 Peter Witt type cars ordered on July 30 by the Department of Street Railways of the City of Detroit from the Cummings Car & Coach Company, Chicago, will begin in October. Following the first delivery eight cars will be completed each week. Payment for the cars, as outlined in the July 23 issue of ELECTRIC RAILWAY JOURNAL, is being made by an initial installment of $250,000 and $18,000 per month over a ten-year period from Aug. 1, 1927, to July 1, 1937, inclusive. The units are of the single-end type and are designed for two-man operation.

Specifications for the units follow:

Number of cars ordered	125
Type of unit	Peter Witt two-man, motor, passenger, city, single end, double truck
Seating capacity	52
Builder of car body	Cummings Car & Coach Company, Chicago
Weight, total	36,000 lb.
Bolster centers, length	23 ft. 9 in.
Length over all	48 ft. 5 in.
Truck wheelbase	5 ft. 6 in.
Width over all	8 ft. 4 in.
Window post spacing	29¼ in.
Body	Steel
Roof	Arch
Doors	Peter Witt
Air brakes	Westinghouse DH-16
Armature bearings	Plain
Car signal system	Faraday
Compressors	DH-16
Conduit	Flexible
Control	K-35 HH
Curtain fixtures	Curtain Supply Company
Curtain material	Pantasote
Destination signs	Hunter
Door mechanism	National Pneumatic
Doors	Front folding, center slide
Energy-saving device	Cleveland
Fare boxes	Cleveland
Finish	Lacquer
Floor covering	Wood
Gears and pinions	Grade M. & B. P.
Glass	D. S. A.
Hand brakes	Peacock
Hand straps	Rico No. 7
Heaters	Gold
Headlights	Golden Rod
Headlining	Three-Star Agasote
Interior trim	Cherry
Journal bearings	Plain
Journal boxes	Symington
Lamp fixtures	Electric Service Supplies Company
Motors	Four General Electric 265, four Westinghouse 510, inside hung
Roof material	Wood
Sash fixtures	Edwards
Seats	Rattan
Seat spacing	29¼ in.
Seating material	Rattan
Steps	Stationary
Step treads	Kass
Trolley	Ohio Brass
Trolley base	Ohio Brass
Trolley wheels	Detroit Street Railway, standard
Trucks	Standard
Ventilators	Railway Utility Company
Wheels	26-in., steel
Wheelguards	H. B.

(*Electric Railway Journal*)

125 more for Detroit

equipped with

"Peacock"

Reg. U. S. Pat. Off.

Staffless Brakes!

America's largest municipally owned and operated electric railway has repeated again on

"Peacock" Staffless Brakes.

One hundred and twenty-five new Peter Witt type cars, built by the Cummings Car & Coach Company, thus equipped have just been placed in service on its lines.

May we tell you why practically all the purchasers of modern cars, in every type of service, specify "Peacock" Staffless Brakes?



The Peacock Staffless

National Brake Company, Inc.

890 Ellicott Square, Buffalo, N. Y.

Canadian Representative

Lyman Tube & Supply Co., Ltd., Montreal, Can.

The PROPER COACH for Every



CAPITAL TRACTION CO.
Washington, D. C.

YELLOW Y



TULSA STREET RAILWAY CO.
Tulsa, Oklahoma

YELLOW X



MILWAUKEE ELECTRIC RY. *and* LIGHT CO.
Milwaukee, Wis.

YELLOW Z



PHILADELPHIA RAPID TRANSIT
Philadelphia, Pa.

YELLOW GAS ELECTRIC

Traffic Problem

WITHIN the Yellow Coach family there is the proper type of vehicle, designed specifically to meet an existing need—

The proper body type.

The proper passenger capacity.

The proper drive.

Present users of Yellow Coaches are familiar with this wide range of selection. By making use of it wisely they have built up operations that are successful and profitable. Their experience, together with our own vast transportation experience, is available to you in the form of valuable operating data studies.

It is through the completeness of Yellow Coach service that you are particularly benefited.

YELLOW TRUCK & COACH MANUFACTURING CO.
SUBSIDIARY GENERAL MOTORS CORPORATION
5801 WEST DICKENS AVENUE, CHICAGO, ILL.

YELLOW COACH

A General Motors Product

Economy and Comfort in Kelly Bus Balloons

TWO essentials to the profitable and efficient operation of a fleet of busses are economy of operation and passenger comfort. The long mileage built into Kelly-Springfield Bus Balloons reduces operating costs to a minimum and the great flexibility and ease of riding insures the maximum of comfort for passengers.

KELLY-SPRINGFIELD TIRE CO.
General Motors Bldg. New York, N. Y.



KELLY SPRINGFIELD BUS BALLOONS

You're Running on Schedule



Keep the wheels turning -- and you keep the busses earning. If they stop too often or too long there's a sure deficit looming up ahead. That's why we put extra quality in every part of the Willard Battery -- and identify it with the Willard Trade Mark for your protection.

H. A. Willard

—and here's a battery trade-mark with a reputation for helping to keep wheels turning, and for doing its part to maintain bus schedules with railroad punctuality. You'll find this mark of quality *only on the Willard Threaded-Rubber Battery.*

WILLARD STORAGE BATTERY CO.
CLEVELAND, OHIO

Willard Batteries

Faster schedules, longer runs forced the need for a tire that was specially built to carry the load and stand up under express speed. General's *Heavy Express Special* is that tire.



—better buy Generals NOW than *buy and buy*

The

GENERAL

TIRE

—goes a long way to make friends

BUILT IN AKRON, OHIO, BY GENERAL TIRE AND RUBBER CO.



International —*the Coach Ideal* *for* Owner — Rider — Driver

Everybody recognizes the vigorous need that has developed for a coach of *medium* capacity, of *tested* performance, providing the *maximum* in comfort, safety, and attractiveness, *moderate* in price, and serviced *"around the corner."*

International Harvester provides such a coach in the popular Model 15. This 6-cylinder International finds and keeps a host of friends wherever its route runs. It answers many calls, establishing profitable routes of shuttle-like frequency, serving railway stations and hotels, serving as feeder to car lines, as peak-load auxiliary to organized routes, serving the suburb, country club, and subdivision, taking the rising generation to the schools—or what have you? It is a money-maker and community builder in one.

The International Model 15 was especially designed and fully perfected for this inevitable market. It fits the natural coach needs of every community. It is bound to appeal to any man interested in passenger transportation. Furnished in three styles, the *street-car type* (shown above), the *Club Coach,* and the *Sedan Coach.* Equipped to carry 15 to 17 passengers — the ideal capacity. Write for the Model 15 Coach Catalog.

As for Service

to attend your coaches, there are 154 Harvester-owned branches all over the United States and Canada. In addition, International Trucks and Coaches have adequate representation in foreign countries throughout the world.

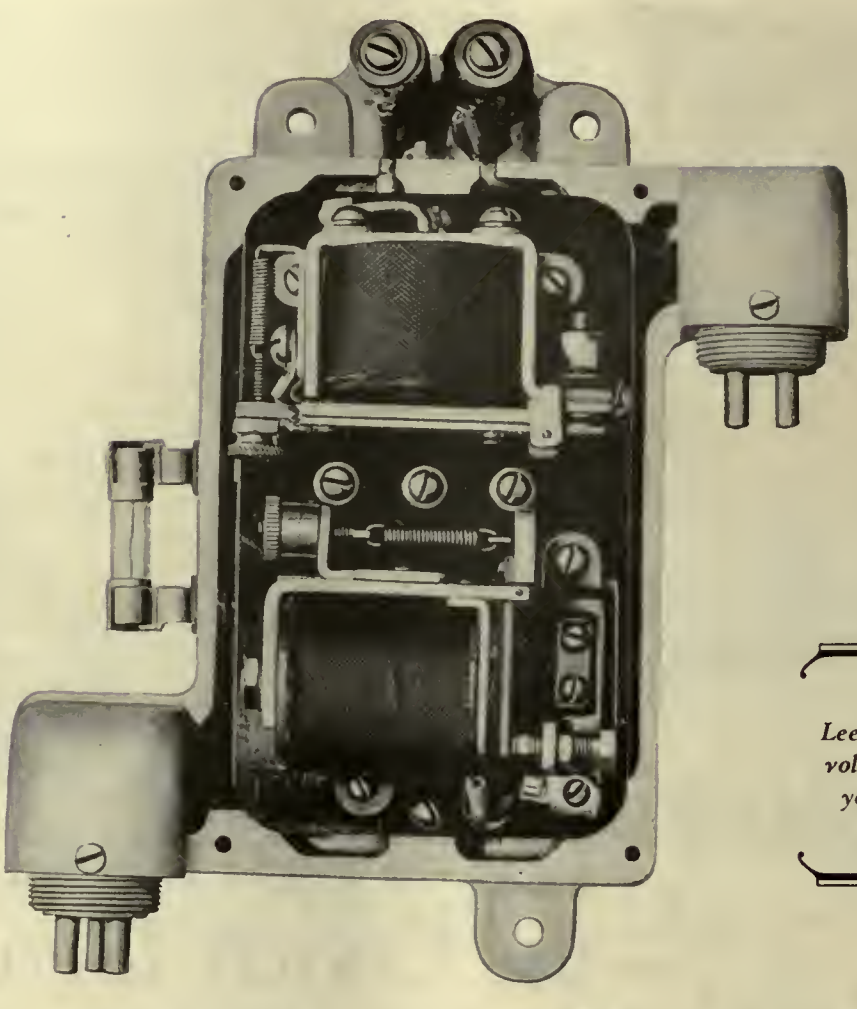
The International line also includes Speed Trucks and Heavy-Duty Trucks, and McCormick-Deering Industrial Tractors

INTERNATIONAL HARVESTER COMPANY
606 So. Michigan Ave. of America (*Incorporated*) Chicago, Ill.

INTERNATIONAL

SIX CYLINDER **COACHES** SIX CYLINDER

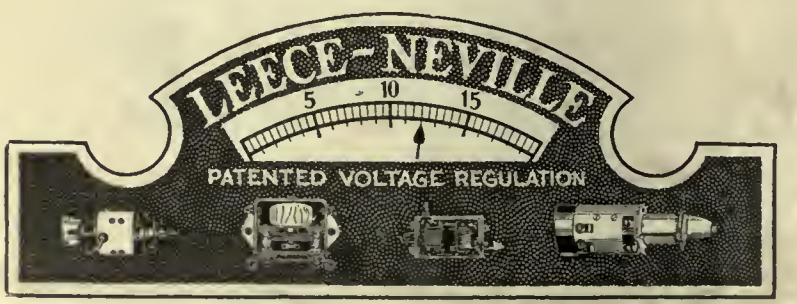
HARVESTER COMPANY



Specify Leece-Neville Patented voltage regulation on your next order for motor coaches

It's a Pleasure

To Look At the Battery Maintenance Sheet



IF you don't use Leece-Neville Voltage Regulation on your motor coaches you've overlooked one of the joys of bus operation.

Down, down, down go battery costs to a point where it's a real pleasure to look at battery maintenance sheets.

Leece-Neville protected batteries are always correctly charged. They can't overcharge. The battery is always full of vim and vigor, ready to go. Lights are as steady as in your own home.

That's the reason for the tremendous popularity of Leece-Neville Patented Voltage Regulators among those who use them. It's the reason they are standard on most of the better motor coaches.

The LEECE-NEVILLE CO.
5353 Hamilton Ave.
Cleveland, Ohio



The 20th Century Doesn't Run to Waukegan—

Why?

Luxury
Economy
Sturdiness

FitzJohn

If you live in the pleasant city of Waukegan, Ill.—40 miles north of Chicago—and want to go to New York, you take some conveyance to Chicago. There you may board the 20th Century Ltd.

The Century doesn't run to Waukegan, because it couldn't pick up enough through business to pay.

For exactly the same reason it doesn't pay you to run big, costly buses between points where you can't get the traffic.

But, as the Century gets Waukegan business through other transportation service, so you can use small light buses as feeders for the big ones. The big ones will thus get more business and profit.

Or, you can use the small jobs in light travel territory—top revenue at a profit which you are not getting, or getting at a loss.

Have you seen the FITZJOHN 12-passenger body, which we build for any good small chassis? It's a beauty—has every comfort and appointment—sturdy—economical to buy and operate.

If you haven't, by all means send for complete information.

FITZJOHN Manufacturing Company

Exclusive Bus Body Builders

Muskegon, Michigan

Sixes are Building



In OTTAWA, ILL. *Above are pictured three of the four Graham Brothers Motor Coaches put into service by the Illinois Power & Light Corporation to replace the trolley cars it formerly operated.*



In HIGH POINT, N. C. *The North Carolina Public Service Company replaced its trolley cars with 5 Graham Brothers 21-passenger street car type motor coaches. The company and its patrons are pleased with the coaches.*

GRAHAM MOTOR

SOLD BY DODGE BROTHERS DEALERS EVERYWHERE

Additional Prestige

Remarkable Day After Day Performance of Graham Brothers Medium Capacity Motor Coaches Pleases Operators—Speed, Comfort, Safety Attract Riders

The high esteem in which Graham Brothers Motor Coaches have always been held by operators is being increased constantly by the smoothness of the 6-cylinder engine and the additional speed, safety and comfort now obtainable because of 4-speed transmission, 4-wheel brakes (Lockheed Hydraulic) and 3-stage progressive type springs.

Commendation has come from operators everywhere—large and small—on the retention of the 21-passenger street car type coach.

Only great volume production makes possible a motor coach of such high quality at so low a price.

GRAHAM BROTHERS
EVANSVILLE – DETROIT – STOCKTON
A DIVISION OF DODGE BROTHERS, INC
GRAHAM BROTHERS (CANADA) LIMITED, TORONTO, ONTARIO

$4045	$4060	$4290
12-Passenger Parlor Coach (f. o. b. Detroit)	21-Passenger Street Car Type (f. o. b. Detroit)	16-Passenger Parlor Coach (f. o. b. Detroit)

BROTHERS COACHES







900-D
Double Rotating Chair
In combination plush and leather with deep individual seat cushions and divided back. For buses and double-end interurban cars.



900-D
Double Stationary Chair
In combination plush and leather with deep individual seat cushions and divided back. For buses and single-end interurban cars.

Chairs for modern interurban cars

Hale & Kilburn Seats are designed primarily for passenger comfort — the essential characteristic for selling rides in modern interurban service.

Among the many recent H & K 900-D installations on progressive roads are:

Chicago & Joliet—Washington, Baltimore & Annapolis—Chicago, North Shore & Milwaukee—Texas Electric—Cincinnati, Hamilton, & Dayton—Chicago, South Shore & South Bend—Rochester & Syracuse — Georgia Power Co. — Chicago, Aurora & Elgin—Northern Ohio P. & L. Co.

If you too, have a new car program or a remodeling program, you will find an H & K Seat to meet your requirements.

Ask for a consultation with one of our representatives.

HALE & KILBURN COMPANY

General Offices and Works: 1800 Lehigh Avenue, Philadelphia

SALES OFFICES:

Hale & Kilburn Co., Graybar Bldg., New York
Hale & Kilburn Co., McCormick Bldg., Chicago
E. A. Thornwell, Candler Bldg., Atlanta
Frank F. Bodler, 903 Monadnock Bldg., San Francisco
T. C. Colman & Son, Starks Bldg., Louisville
W. L. Jefferies, Jr., Mutual Bldg., Richmond
W. D. Jenkins, Praetorian Bldg., Dallas, Texas
H. M. Euler, 146 N. Sixth St. Portland, Oregon

Hale and Kilburn SEATS

Waukesha-equipped Fageol "Safety Coach"



a-745-L

A New "Ship of the Desert"

The modern "Ship of the Desert" is a comfortable, high speed motor bus, but it must have unfailing camel reliability for the long runs between oases. These Fageol "Safety Coaches" have proved the unfailing reliability, long life and economical operation of Waukesha "Ricardo Head" six cylinder bus engines.

Waukesha six-cylinder bus and truck engines are now built in three models, ranging from 50 to 125 H. P. The two smaller ones constitute the power plant for the "Twin Coach," the medium size is especially economical in 16 to 21 passenger buses and the 125 H. P. ideal for the largest DeLuxe types, either mechanical or gas-electric driven. Let us assist you in selecting the best size of engine for your bus or truck.

A-792-L

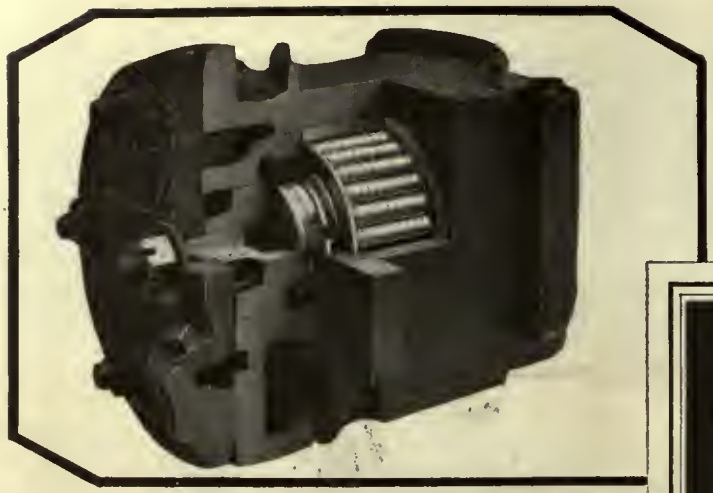
AUTOMOTIVE EQUIPMENT DIVISION

WAUKESHA MOTOR COMPANY

Waukesha Eight W. 40th Street **Wisconsin**

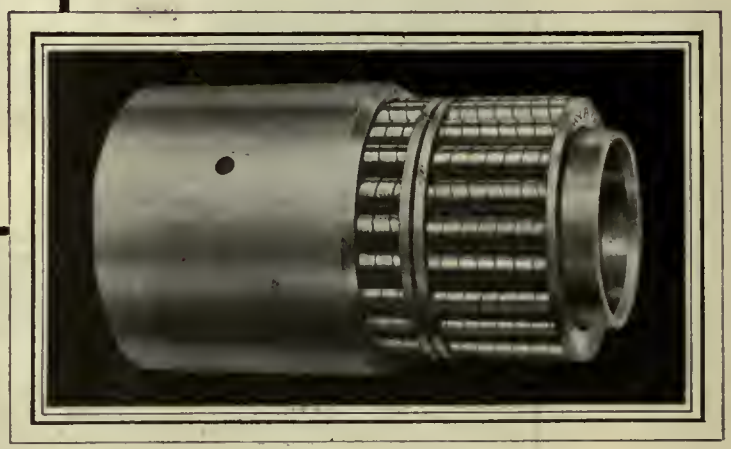
Eastern Sales Offices *New York City*

Exclusive Builders of Heavy Duty Automotive Type Engines Over Twenty Years



The Hyatt Roller Bearing journal box for street railway service—sectioned to show construction.

Hyatt Roller Bearings meet every A. E. R. A. requirement for standard equipment or replacement.



True Anti-Friction Bearings for railway car journals

Hyatt Roller Bearings take the jolt out of railroading.

They promote smooth and rapid acceleration—coasting instead of pulling. Their motion is frictionless.

Rain, snow and dust cannot interfere with their easy operation.

Hyatts consume but a fractional part of the oil which brass bearings require. Their mileage is several times greater in comparable service.

Hyatts are true anti-friction bearings—and are unusually quiet.

A mechanical engineer from the Hyatt Railway Department will be glad to present some interesting facts on operating economy.

HYATT ROLLER BEARING COMPANY

Newark Chicago Detroit Pittsburgh Oakland

HYATT

ROLLER BEARINGS

PRODUCT OF GENERAL MOTORS

"THERE IS A TEXACO LUBRICANT FOR EVERY PURPOSE"

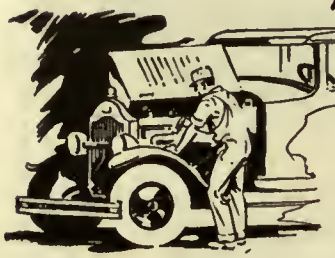


The same care in refining, the same scrupulous attention to quality which have earned for TEXACO Motor Oil the reputation for being the finest automotive lubricant in the world, are used in the manufacture of every industrial lubricant made by

THE TEXAS COMPANY
Texaco Petroleum Products
Dept. ED2, 17 Battery Place, New York City
OFFICES IN PRINCIPAL CITIES

Bus Operators

Our Lubrication Service Will Help to Increase Your Profits



THE services of our Bus Lubrication Engineers are available to make specific recommendations for the proper lubrication of your Motor Bus fleet. Our lubrication experts also may be depended upon to offer other assistance which will result in lowering your operating and maintenance costs.

At your request we will send a Bus Engineer, thoroughly trained in every branch of motor bus lubrication, who will make a survey of your equipment. After studying the conditions under which your fleet operates, he will recommend lubrication practices which will lead to increased efficiency, lower fuel and lubrication costs and increased profits.

Such recommendations should come only from, and be executed under the guidance of a Bus Lubrication Engineer. For decreased lubrication costs do not always indicate economical bus operation. Occasional tests have shown that as a result of decreasing the lubrication expense, fuel costs have increased. Our Bus Engineers may be depended upon to recommend correct lubrication practices and the proper grade of

Polarine Motor Oil

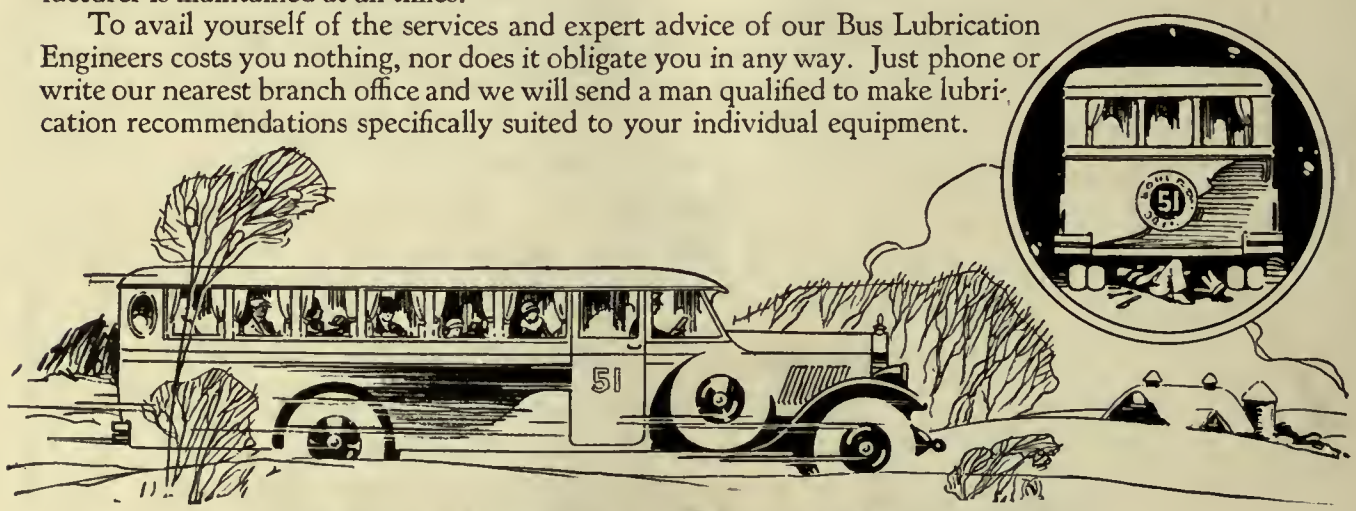
or

Iso-Vis Motor Oil

which will correctly lubricate your fleet and keep operating costs at a minimum.

Through the use of either of these oils, your fleet will receive unfailing lubrication which will protect frictional surfaces against wear and tear and prolong the life of your buses. The protection which your equipment receives from these oils lasts from the time they are poured into the crankcase until they are drained away. Providing, of course, the proper oil level as recommended by the manufacturer is maintained at all times.

To avail yourself of the services and expert advice of our Bus Lubrication Engineers costs you nothing, nor does it obligate you in any way. Just phone or write our nearest branch office and we will send a man qualified to make lubrication recommendations specifically suited to your individual equipment.



STANDARD OIL COMPANY

(INDIANA)

General Offices: 910 S. Michigan Avenue

CHICAGO, ILLINOIS

ILLINOIS	INDIANA	IOWA	S. DAKOTA	N. DAKOTA	MINNESOTA	MISSOURI
Chicago	Evansville	Davenport	Huron	Fargo	Duluth	Kansas City
Decatur	Indianapolis	Des Moines	MICHIGAN	Minot	Mankato	St. Joseph
Joliet	South Bend	Mason City	Detroit	WISCONSIN	Minneapolis	St. Louis
Peoria	KANSAS	Sioux City	Grand Rapids	La Crosse		
Quincy	Wichita		Saginaw	Milwaukee		
				Green Bay		

All that you can ask of a pole



MAINTAINED STRENGTH
LOW COST
LONG LIFE
UNINTERRUPTED SERVICE

STRENGTH, uninterrupted service, long life, low cost—all the requirements for a good pole are found in Amcreco Creosoted Southern Yellow Pine Poles.

Strength—In the unprecedented sleet storm of 1924 which covered an area from southern Michigan to Texas, only 100 creosoted pine poles failed while 58,700 untreated poles went down.

Uninterrupted Service—In Texas one creosoted pine pole line built in 1909 has not had a single replacement.

Long Life—The Washington-Norfolk line of the A. T. & T. Co. built of creosoted poles 30 years ago is still in "good-as-new" condition. The Public Service Co. of New Jersey reports poles in service 32 years and "good yet."

Low Cost—The Georgia Power Co., using creosoted poles, mostly Amcreco and partly furnished by their own organization, reports a saving of $281.98 per mile of line. Amcreco Creosoted Southern Yellow Pine Poles are carefully selected and thoroughly treated with pure creosote oil. Ask for quotations.

AMERICAN CREOSOTING COMPANY
INCORPORATED

COLONIAL CREOSOTING COMPANY INCORPORATED
AMCREO LOWRY PROCESS CREOSOTED WOOD
GEORGIA CREOSOTING COMPANY INCORPORATED

LOUISVILLE ~ KENTUCKY

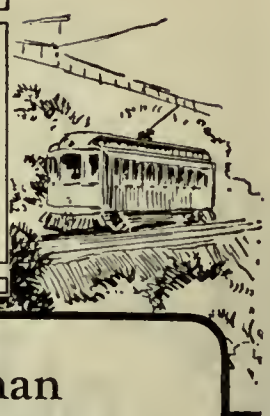
SALES OFFICES

332 So. Michigan Ave. Chicago
350 Madison Ave. New York City
Brunswick, Ga.
401 W. Main St. Louisville, Ky.
Bogalusa, La.

HRJ12-1 Gray



VIZABLEDG
PATENTED
SAFKAR
TRADE MARK REG
SAFSTEP



Cheaper Than Liability Insurance

One car step accident may cost you more than equipping every car on your system with slip-proof, miss-proof, time-proof "*Safkar Safsteps.*" And this safety feature will earn you handsome dividends in added good will.

You'll materially reduce your maintenance costs, too—for these all-steel steps will last as long as the car—and be safe and clean in all weathers.

Write for Bulletin D28.

IRVING IRON WORKS CO.
LONG ISLAND CITY, N.Y. U.S.A.
Established 1902



P-135

STORM PROOF

Heavily Overloaded
But Not One Casualty

WINTER storms always find and wreck the weak poles, an excellent test to determine the "stand-up-ability" of poles in emergencies.

The ***International*** Creosoted Pine Line illustrated below survived the most severe storm in history. Not one pole was damaged while hundreds of other poles were demolished in the same locality. This performance is especially noteworthy because the line was designed for the light storm area and the poles had to carry a tremendous overload.

The great uniform strength of Southern Yellow Pine together with conscientious manufacture and treatment makes ***International*** Poles what service proves them to be—

POLES THAT STAND UP IN SERVICE

International Poles, in light storm area heavily overloaded, easily withstood the ice load. In service of the Southwestern Bell lines.

International Creosoting & Construction Co.
Galveston—Texarkana—Beaumont



International
Creosoted Yellow Pine Poles

ANNUAL

Statistical and *Forecast* *Number*

Electric Railway Journal
January 14, 1928

This important number will contain:

Record of 1927 in costs and revenues.

Number of cars purchased.

Miles of track constructed and reconstructed.

Financial records for 1927.

Reviews of basic tendencies in legal, financial and regulatory matters.

A review of the significant news developments of 1927.

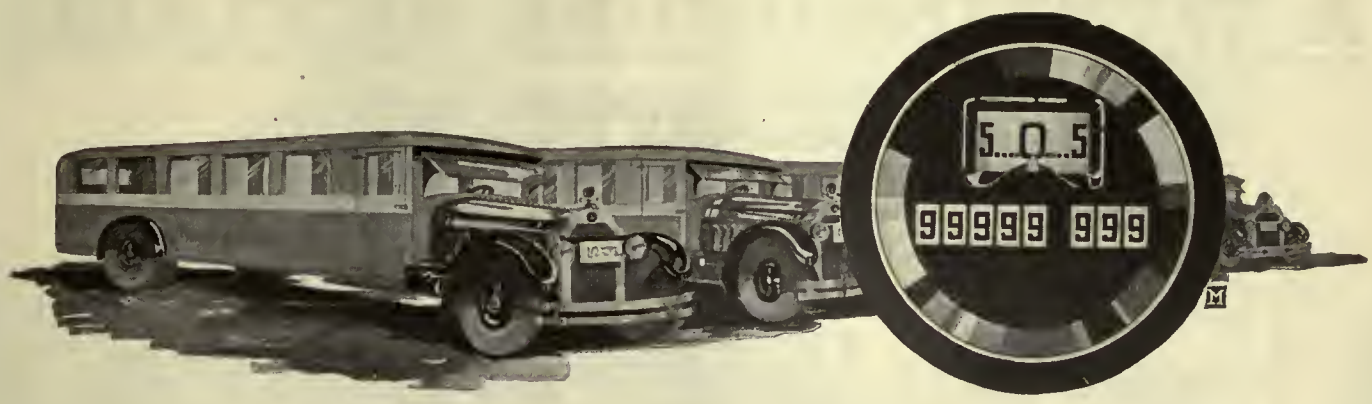
Together with:

A forecast of 1928 expenditures in all departments, and the trends which will shape developments and progress of 1928.

Advertising forms close January 3, 1928

Electric Railway Journal
Tenth Ave. at 36th St., New York City

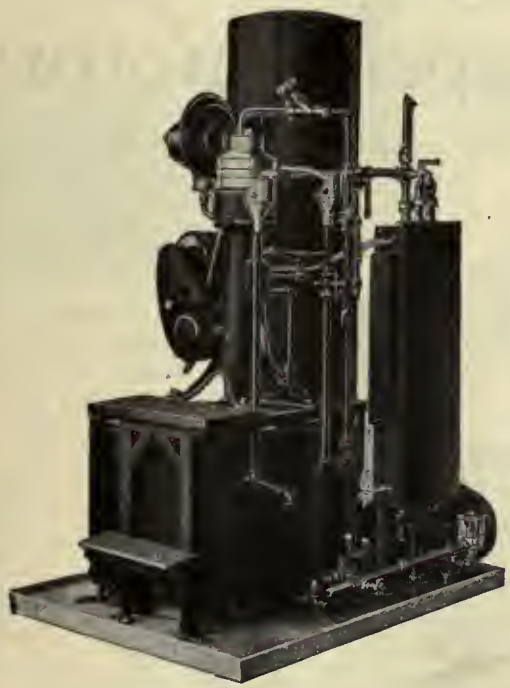
Member ABC Member ABP



Will your Speedometers Register the limit 5 times?

They can if your Motors are properly lubricated!

Friction, the mortal enemy of motors, puts more vehicles on the scrap heap than any other single cause. And, friction, as any operator knows, is caused by poor lubrication.



But owners of fleets of buses or trucks can easily insure for their units the kind of lubrication that will enable them to deliver thousands of miles of excess service.

Lubrication engineers and oil refiners state that *oil does not wear out!* It simply loses its ability to lubricate by becoming contaminated with road dust, carbon, water and gasoline. *Removal of these impurities provides a lubricant equal in every respect to new oil.* In fact, lubricating authorities state that properly purified oil is superior to new oil because the carbon forming elements are largely eliminated and carbon will not thereafter form so quickly.

The De Laval Crankcase Oil Reclaiming Outfit renews old oil —restores its viscosity—its ability to lubricate—enables you to change oil more frequently—at a cost of but *10 to 18 cents per gallon!*

Fleet owners who are using the De Laval have found that any handy man can operate it and that in a short time it pays for itself.

Write today for information showing how you can keep your fleet on the road longer. Ask for Bulletin 108-R.

THE DE LAVAL SEPARATOR COMPANY
165 Broadway, New York 600 Jackson Blvd., Chicago
DE LAVAL PACIFIC COMPANY, San Francisco
ALFA-LAVAL CO. Ltd., 34 Grosvenor Road, London, S. W. 1.

DE LAVAL

Centrifugals

A WESTINGHOUSE-NUTTALL DEVELOPMENT

An outstanding contribution to modern passenger car design



W-N Drive for use with light-weight high-speed motors

—Heat-treated hardened helical gears—

—Timken roller bearings—

—Oil-tight steel gear case—

—High ratio of speed reduction—

Here is an equipment which has already attracted wide and favorable interest. The industry has been quick to sense its advantages—smoother starting, quiet operation, rapid acceleration and greater all-round efficiency.

MEMBER AMERICAN ELECTRIC RAILWAY MANUFACTURERS ASSOCIATION AERA 1927

R.D. NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

All Westinghouse Electric & Mfg. Co. district offices are sales representatives for Nuttall Railway Products.

Canadian Agents:
Lyman Tube & Supply Co., Montreal

Nuttall

"Standardize On Dayton Ties"

Say Engineers To Their Companies

The Dayton
Mechanical Tie Co.,
DAYTON, OHIO



"Standardize On Dayton Ties"

The Electric Railway Engineer can't afford to listen to mere *claims*. But he knows *proof* when he sees it.

All over the United States, engineers are discovering, through their own experience, and through the experience of brother engineers, that Dayton Tie Track lasts and stays smooth far longer than any other. They are finding that track maintenance virtually disappears.

Once he sees, he acts. He says to his company "Standardize on Dayton Ties."

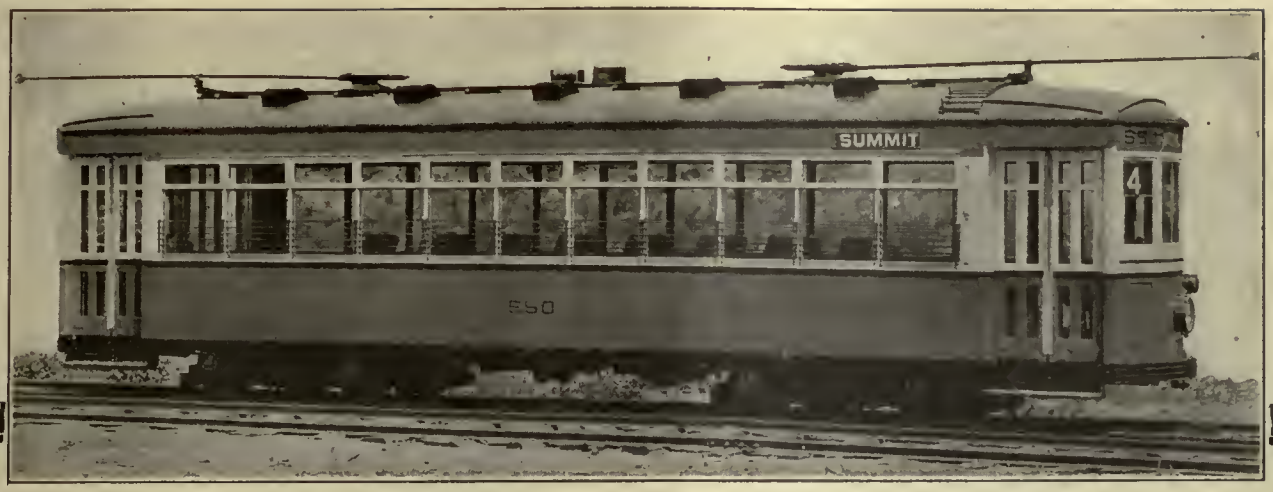
Like a rolling snowball, the number of Dayton Standardized Properties is increasing by leaps and bounds.

Lay a trial strip of Dayton Tie Track, and you will want to standardize, too.

Dayton Tie Track is always Smooth

THE DAYTON
MECHANICAL TIE CO.
DAYTON, OHIO





"STANDARD" WHEELS

ON MODERN EQUIPMENT

On these fifty new double truck safety cars for Worcester Consolidated Street Ry. "Standard" 26 in. wheels were specified.

ROLLED STEEL WHEELS—AXLES—SPRINGS—ARMATURE SHAFTS

STANDARD STEEL WORKS COMPANY

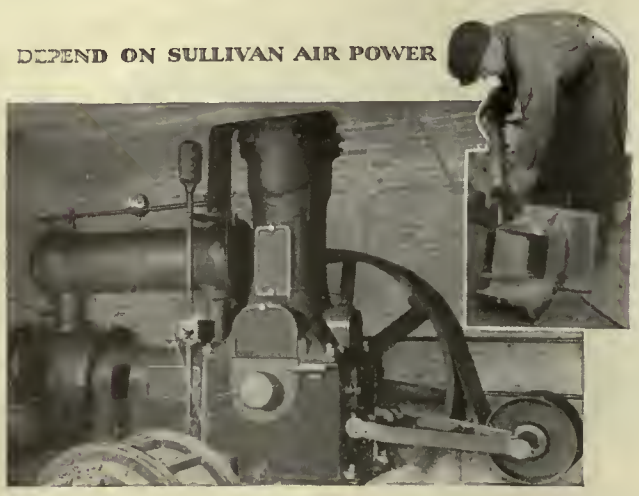
PHILADELPHIA, PA.

BRANCH OFFICES

CHICAGO
ST. LOUIS
NEW YORK
HOUSTON
PORTLAND
RICHMOND
MEXICO CITY
SAN FRANCISCO
ST. PAUL
PITTSBURGH

WORKS: BURNHAM, PA.

DEPEND ON SULLIVAN AIR POWER



Making Steel Castings with Angle Compounds

For 11 years the Burnside Steel Company of Chicago has used Angle Compound Compressors in making high grade castings. The compressors supply air for chipping hammers, sand rammers, drills, grinders, hoists, and power moulding machines, for sand blasting, and for ventilating systems.

General Manager Bassini Says:

"In 1916 we installed our first Angle Compound Air Compressor. Our selection was made after inspection of installations at other plants, and was influenced by reports from many satisfied users of Angle Compounds.

"The performance of this compressor proved the soundness of our choice, and when it became necessary in 1918 to increase our air supply, the question of the size of our next Angle Compound Compressor was the only problem confronting us.

"Both of our Angle Compound Compressors have been in steady use since installed, and at no time have our operations been hampered by lack of air."

Dependable performance has made Angle Compound Compressors famous in every industry. They are available in capacities from 400 to 5100 cu. ft.; for belt drive or for direct connection to electric motor, or oil engine.

Write today for Catalog 3283-A.

SULLIVAN

Sullivan Machinery Company
150 So. Michigan Ave., Chicago, Ill.

Saves $15 a month

reclaiming waste with Oakite!

THAT is what is being done in the shops of one railway company, since it adopted the practice of washing its dirty, oily waste the Oakite way.

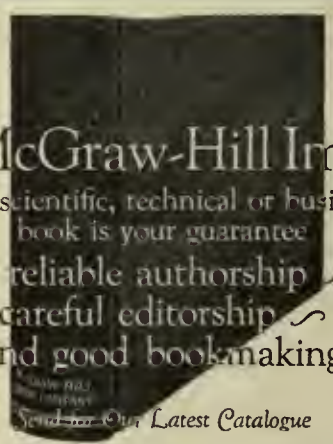
For cotton and woolen waste cleaned with Oakite can be used over and over again. In this way you can save most of what you now spend for new waste!

Don't overlook this opportunity for a worthwhile saving! Our booklet, "Cleaning in Car Shops" will put you on the right track. Write for a copy.

Oakite Service Men, cleaning specialists, are located in the leading industrial centers of the U. S. and Canada

Oakite is manufactured only by
OAKITE PRODUCTS, INC., 28B Thames St., NEW YORK, N. Y.
(Formerly OAKLEY CHEMICAL CO.)

OAKITE
TRADE MARK REG. U.S. PAT. OFF.
Industrial Cleaning Materials and Methods



The McGraw-Hill Imprint
on a scientific, technical or business book is your guarantee
of reliable authorship
careful editorship
and good book-making

Send for Our Latest Catalogue

McGRAW-HILL BOOK COMPANY, Inc.
370 Seventh Avenue New York

— McGRAW-HILL —
FREE CATALOGUE COUPON

McGraw-Hill Book Company, Inc.,
370 Seventh Avenue, New York, N. Y.

Send me the New 1927-28 McGraw-Hill Catalogue to the address given below. This catalogue is FREE. I understand.

Name .....

Address .....

City and State .....

E. 12-17-27

Shuler Front Axles



For
TRUCKS, MOTOR BUSSES,
TAXIS

And a Complete Line for
TRACTORS and TRAILERS

ENDORSEMENT

Public Endorsement of a product makes it imperative that it be the best. An economic waste results should there be inferiority.

FRONT AXLES ONLY

Shuler Axle Co.

Incorporated

Louisville, Ky.

Member of Motor Truck Industries, Inc., of America



Don't Wind Trouble Into Repair Jobs!

As you would dike a river to stand high water, tape a repair job to stand overloads and line surges. Break-downs cost money . . . often lives! When buying tapes consider *insulation first*; price next. A single bad "short" can cost you more than all the savings you have ever made on doubtful tapes.

For Safety, Use Acme

Varnished Tapes

Electrically and Physically Tested for

DIELECTRIC STRENGTH
DIELECTRIC CONSTANT
DIELECTRIC LOSS
INSULATION RESISTANCE
POWER FACTOR
FLEXIBILITY
RESISTANCE TO TEAR
TENSILE STRENGTH
RESISTANCE TO OILS, ACIDS AND GASES
RESISTANCE TO IMPREGNATING COMPOUNDS

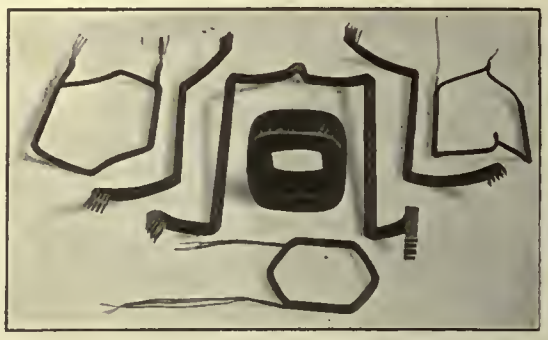
Acme Varnished Tapes are furnished in widths of ¼ inch and wider, and in rolls of continuous length without splices. Special widths and finishes supplied on order. Write for catalog 3-J for your files.

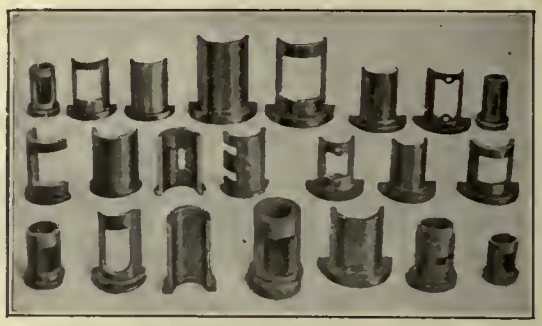
THE ACME WIRE CO.

Main Office and Plant, New Haven, Conn.

Branches

New York, 52 Vanderbilt Ave. Chicago, 427 West Erie Street
Cleveland, Guardian Bldg.





COILS and BEARINGS

COLUMBIA Field and Armature Coils are made on modern machinery with the highest grade materials and with the greatest care regarding slot dimensions. Quality in coils means economy in coils. With Columbia-made coils you will also find economy in price.

Armature and Field Coils
Grey Iron and Brass Castings
Machine and Sheet Metal Work
Special Machinery
Forgings and Patterns

COLUMBIA armature and axle bearings, motor bearings, compressor bearings and journal bearings are cast from specially developed bronze and accurately machined to provide perfect halves and complete interchangeability. They are bearings with a reputation for long wear and lower cost.

The **Columbia Machine Works & M. I. Co.**

263 Chestnut Street, Cor. Atlantic Avenue, Brooklyn, N. Y.



Complete satisfaction

Operating perfectly and requiring minimum attention for maintenance and lubrication, Earll Catchers and Retrievers give genuinely satisfactory results. Their refinement of design, and mechanical superiority are summarized in the following five features, peculiar to Earll construction.

No-wear Check Pawl
Free-Winding Tension Spring
Ratchet Wind
Emergency Release
Perfect Automatic Lubrication

Earll Catchers and Retrievers

C. I. EARLL, York, Pa.

Canadian Agents:
Railway & Power Engineering Corp., Ltd., Toronto, Ont.
In All Other Foreign Countries:
International General Electric Co., Schenectady, N. Y.

Griffin Wheel Company

410 North Michigan Ave.
Chicago, Ill.

Griffin Wheels

with
Chilled Rims
and
Chilled Back of Flanges
For Street and Interurban Railways

FOUNDRIES:

Chicago	Boston	St. Paul
Detroit	Kansas City	Los Angeles
Denver	Council Bluffs	Tacoma
Cleveland	Salt Lake City	Cincinnati



TRUCK WITH TOWER IN RUNNING POSITION

TRENTON TOWER

This 3-Section

is not only more convenient, but stronger than the older type.

The top section is reinforced by the intermediate section. The 3-section design makes it possible to raise the platform 16 inches higher and drop it 12 inches lower than can be done with the old-style 2-section tower.

We'll gladly send you details.

J. R. McCARDELL CO.
Trenton, New Jersey, U. S. A.

"Speed 'em up"



You can when

N-A-C-H-O-D

Spells safety!

"Speed 'em up," say those who have tried and won back steady patronage. The public wants speed,—safe speed. And the safety part can be taken care of adequately by a suitable installation of up-to-the-minute Nachod or United States Signals.

Our Catalog covering Block Signals, Highway Crossing Signals, Headway Recorders, Flasher Relays, etc., contains some revenue producing ideas. Send for a copy.

Nachod & United States Signal Co., Inc.
4777 Louisville Avenue, Louisville, Ky.
ENGLISH REPRESENTATIVE:
Forest City Electric Co., Ltd., Menchester, Eng.



Forging Ahead

Heralded by advanced designs in construction and innovations in equipment, Electric Railways are forging ahead as never before.

Well in the van are Elreco Tubular Steel Poles, already contributing their bit to the march of progress.

Today Elreco poles are the most economical to install and maintain. They are handsomer, lighter, more adaptable. Trolley wires, lighting wires and lighting units are all carried on one pole.

Join the hundreds of companies who have beautified thoroughfares and reduced costs with Elreco Tubular Steel Poles.

Get the story back of Elreco. *Write.*

The Electric Railway Equipment Co.
2900 Cormany Ave. Cincinnati, Ohio
30 Church St. New York City

Greater Service Per Dollar Invested



"Tiger" Bronze Axle and Armature Bearings

More-Jones "Tiger" Bronze castings for axle and armature bearing service was one of our early achievements. This is probably the most widely known bronze on the market. It has stood the test of time. There is nothing better for long, efficient and most economical results. Let us quote you.

National Bearing Metals Corporation
St. Louis, Mo.

MORE-JONES QUALITY PRODUCTS



JOHNSON FARE COLLECTING SYSTEMS

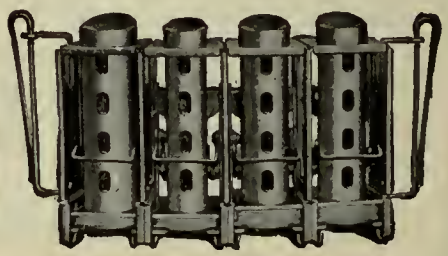


Johnson Electric Fare Boxes and overhead registers make possible the instantaneous registering and counting of every fare. Revenues are increased 1½ to 5% and the efficiency of one-man operation is materially increased. Over 4000 already in use.

When more than two coins are used as fare, the Type D Johnson Fare Box is the best manually operated registration system. Over 50,000 in use.

Johnson Change-Makers are designed to function with odd fare and metal tickets selling at fractional rates It is possible to use each barrel separately or in groups to meet local conditions. Each barrel can be adjusted to eject from one to five coins or one to six tickets.





Johnson Fare Box Co.
4619 Ravenswood Ave., Chicago, Ill.



Drip Points for Added Efficiency

They prevent creeping molature and quickly drain the petticoat in wet weather, keeping the inner area dry.

The Above Insulator—No. 72—Voltages—Test—Dry 64,000 Wet 31,400, Line 10,000.

Our engineers are always ready to help you on your glass insulator problem. Write for catalog.

Hemingray Glass Company
Muncie, Ind.
Est. 1848—Inc. 1870

Used and Surplus Equipment

INDIVIDUAL items of used equipment, or surplus new equipment, or complete plants, are disposed of (and found) through advertising in the *Searchlight* Section of this paper.

This is the section which so effectively aided the Government in selling the many millions of dollars worth of surplus material and equipment accumulated during the war without disturbing the market.

"SEARCHLIGHT"



STEEL CROSS TIES

insure a permanent, repair-free track. Temperature variations, water or decay will not affect it. ¶ Steel Cross Ties are now being used in practically all new work where economy and permanency are the chief considerations. ¶ If you are interested in "low-maintenance-cost" track, send for a copy of our booklet—Steel Cross Ties.

CARNEGIE STEEL COMPANY

General Offices · Carnegie Building · 434 Fifth Avenue

PITTSBURGH PENNSYLVANIA



Strombos Signals for Railway Service

A pleasing sound of tremendous volume is emitted from the powerful Strombos Signal which is admirably suited for railway service. Day in, day out, it broadcasts a warning of approaching danger and promotes safe and efficient railway operation.

The Strombos Signal operates on an air pressure of 10 lbs. and over and is controlled by a lever valve and cord. It uses only 1/10 the volume of air required by a whistle. It has no moving parts which might fail in the emergency.

Write us for more complete data.

AMERICAN STROMBOS CO.

INCORPORATED

18th & Market Sts., Philadelphia, Pa.

ELECTRICAL INSULATION

MICANITE and EMPIRE

Micanite and Super-Micanite Sheets, Commutator Segments, and Commutator Rings.

Micanite Tubes and Washers

Linotape, Seamless or Sewn Bias (*Yellow or Black Varnished Tapes*)

Empire Oiled Cloths and Papers (*Yellow or Black*)

Compounds, Varnishes, Etc.

Send for catalog and helpful booklet on Commutator Insulation and Assembly

MICA INSULATOR COMPANY

Largest manufacturers in the world of mica insulation.
Established 1893.

New York: 68 Church St. Chicago: 542 So. Dearborn St.

Cleveland Pittsburgh Cincinnati
San Francisco Los Angeles Seattle

Works: Schenectady, New York. Victoriaville, Canada: London, England

KERITE

AN INVESTMENT



When you put your money into KERITE you make an investment in service. You do more than buy conductors, insulation, and protection. You obtain the best possible combination of the most desirable qualities in permanent form. KERITE remains long after the price is forgotten.

KERITE INSULATED WIRE & CABLE COMPANY

NEW YORK CHICAGO

Bankers and Engineers

Ford, Bacon & Davis
Incorporated
Engineers
115 Broadway, New York
PHILADELPHIA CHICAGO SAN FRANCISCO

The J. G. White Engineering Corporation
Engineers—Constructors
Oil Refineries and Pipe Lines, Steam and Water Power Plants, Transmission Systems, Hotels, Apartments, Office and Industrial Buildings, Railroads.
43 Exchange Place New York

STONE & WEBSTER
Incorporated
Design and Construction
Examinations Reports Appraisals
Industrial and Public Service Properties
NEW YORK BOSTON CHICAGO

THE BEELER ORGANIZATION
Transportation, Traffic, Operating Surveys
Better Service—Financial Reports
Appraisals—Management
52 Vanderbilt Ave. New York

SANDERSON & PORTER
ENGINEERS
PUBLIC UTILITIES & INDUSTRIALS
Design Examinations Construction Reports Management Valuations
CHICAGO NEW YORK SAN FRANCISCO

ENGELHARDT W. HOLST
Consulting Engineers
Appraisals Reports Rates Service Investigation
Studies on Financial and Physical Rehabilitation
Reorganization Operation Management
683 Atlantic Ave., BOSTON, MASS.

ALBERT S. RICHEY
ELECTRIC RAILWAY ENGINEER
WORCESTER, MASSACHUSETTS
REPORTS - APPRAISALS - RATES - OPERATION - SERVICE

WALTER JACKSON
Consultant on Fares and Motor Buses
The Weekly and Sunday Pass—Differential Fares—Ride Selling
Holbrook Hall 5-W-3
160 Gramatan Ave., Mt. Vernon, N. Y.

A. L. DRUM & COMPANY
Consulting and Constructing Engineers
VALUATION AND FINANCIAL REPORTS
RATE STUDIES FOR PRESENTATION TO PUBLIC SERVICE COMMISSIONS
CONSTRUCTION AND MANAGEMENT OF ELECTRIC RAILWAYS
230 South Clark Street, Chicago, Ill.

DAY & ZIMMERMANN, INC.
ENGINEERS
DESIGN - CONSTRUCTION - REPORTS
VALUATIONS - MANAGEMENT
NEW YORK PHILADELPHIA CHICAGO

STEVENS & WOOD
INCORPORATED
ENGINEERS AND CONSTRUCTORS
120 BROADWAY, NEW YORK
ENGINEERING CONSTRUCTION YOUNGSTOWN, O. FINANCING MANAGEMENT

HEMPHILL & WELLS
CONSULTING ENGINEERS
Gardner F. Wells Albert W. Hemphill
APPRAISALS
INVESTIGATIONS COVERING
Reorganization Management Operation Construction
43 Cedar Street, New York City

TRAFFIC CONSULTANT
Freight Rate, Tariff and Traffic Analyses;
Advisory Freight Traffic Assistance on Special or Monthly Basis;
Preparation of Cases before Interstate Commerce Commission and State Commissions.
HALSEY McGOVERN
Mills Bldg., 17th and Pa. Ave., Washington, D. C.

C. B. BUCHANAN, President — W. H. PRICE, JR., Sec'y-Treas. — JOHN F. LAYNG, Vice-President
BUCHANAN & LAYNG CORPORATION
Engineering and Management, Construction
Financial Reports, Traffic Surveys
and Equipment Maintenance
BALTIMORE 1004 Citizens National Bank Bldg. — Phone: Hanover: 2142 — NEW YORK 49 Wall Street

E. H. FAILE & CO.
Designers of
Garages— Service Buildings—Terminals
441 LEXINGTON AVE. NEW YORK

McCLELLAN & JUNKERSFELD
Incorporated
ENGINEERING AND CONSTRUCTION
Examinations—Reports—Valuations
Transportation Problems—Power Developments
68 Trinity Place, New York
Chicago St Louis

THE BABCOCK & WILCOX COMPANY

85 Liberty Street, New York

Builders since 1868 of Water Tube Boilers of continuing reliability

BRANCH OFFICES

Boston, 80 Federal Street
Philadelphia, Packard Building
Pittsburgh, Farmers Deposit Bank Building
Cleveland, Guardian Building
Chicago, Marquette Building
Cincinnati, Traction Building
Atlanta, Candler Building
Phoenix, Ariz., Heard Building
Dallas, Tex., Magnolia Building
Honolulu, H. T., Castle & Cooke Building
Portland, Ore., Gasco Building

WORKS
Bayonne, N. J.
Barberton, Ohio

Makers of Steam Superheaters since 1898 and of Chain Grate Stokers since 1893

BRANCH OFFICES

Detroit, Ford Building
New Orleans, 344 Camp Street
Houston, Texas, Electric Building
Denver, 444 Seventeenth Street
Salt Lake City, Kearns Building
San Francisco, Sheldon Building
Los Angeles, Central Building
Seattle, L. C. Smith Building
Havana, Cuba, Calle de Aguiar 104
San Juan, Porto Rico, Royal Bank Building

J. ROWLAND BIBBINS

Engineer—2301 Connecticut Ave., N.W., Washington, D. C.

TRANSPORTATION SURVEYS
Organized Traffic Relief and Transit Development
Co-ordinating Motor Transport, Railroad and City Plans, Service, Routing, Valuation, Economic Studies
EXPERIENCE IN 20 CITIES

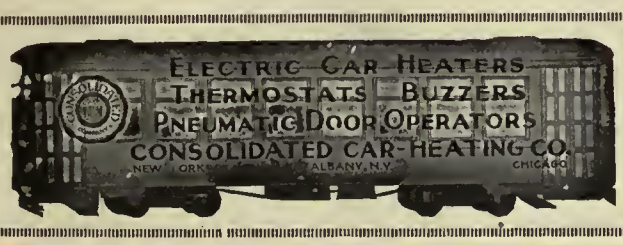
KELKER, DeLEUW & CO.

CONSULTING ENGINEERS
REPORTS ON
Operating Problems Valuations Traffic Surveys
111 W. Washington Street, Chicago, Ill.

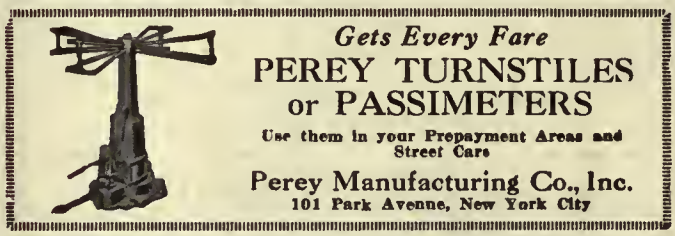
THE P. EDWARD WISH SERVICE

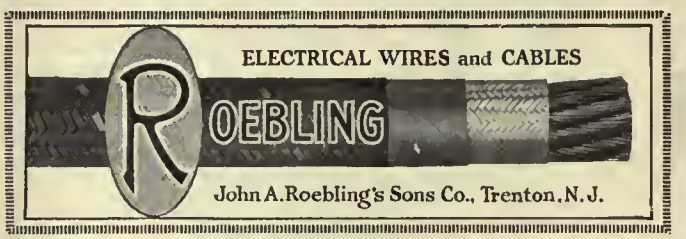
50 Church St. NEW YORK — *Street Railway Inspection* DETECTIVES — 131 State St. BOSTON

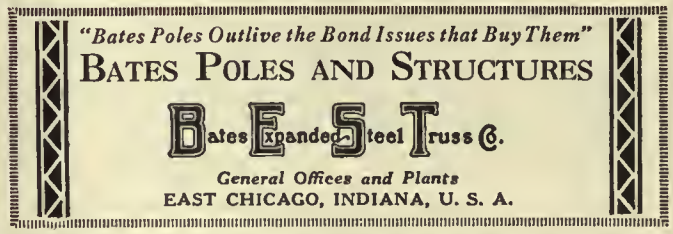
When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.















AMERICAN BRIDGE COMPANY

EMPIRE BUILDING—71 BROADWAY NEW YORK, N. Y.

Manufacturers of Steel Structures of all classes particularly BRIDGES AND BUILDINGS

ALSO STEEL BARGES FOR HARBORS AND RIVERS, STEEL TOWERS FOR ELECTRIC TRANSMISSION, HEROULT ELECTRIC FURNACES, ETC.

SALES OFFICES:

NEW YORK, N.Y. — Philadelphia, Pa. Boston, Mass. Baltimore, Md.

PITTSBURGH, PA. — Cincinnati, Ohio Cleveland, Ohio Detroit, Mich.

CHICAGO, ILL. — St. Louis, Mo. Denver, Colo. Salt Lake City, Utah Duluth, Minn. Minneapolis, Minn.

Pacific Coast Representative: U.S. Steel Products Co., Pacific Coast Dept. San Francisco, Cal. Los Angeles, Cal. Portland, Ore. Seattle, Wash.

Export Representative: United States Steel Products Co., 30 Church Street, New York.

Lorain Special Trackwork Girder Rails

Electrically Welded Joints

THE LORAIN STEEL COMPANY

Johnstown, Pa.

Sales Offices:

Atlanta Chicago Philadelphia Cleveland Pittsburgh New York Dallas

Pacific Coast Representative:
United States Steel Products Company
Los Angeles Portland San Francisco Seattle

Export Representative:
United States Steel Products Company, New York, N. Y.

Bethlehem Products for Electric Railways

Tee and Girder Rails; Machine Fitted Joints; Splice Bars; Hard Center Frogs; Hard Center Mates; Rolled Alloy Steel Crossings; Abbott and Center Rib Base Plates; Rolled Steel Wheels and Forged Axles; Tie Rods; Bolts; Tie Plates and Pole Line Material.

Catalog Sent on Request

BETHLEHEM STEEL COMPANY, Bethlehem, Pa.

BETHLEHEM

B. A. HEGEMAN, Jr., President H. A. HEGEMAN, First Vice-Pres. and Treas.
F. T. SARGENT, Secretary W. C. PETERS, Vice-Pres. Sales and Engineering

National Railway Appliance Co.

Graybar Building, 420 Lexington Ave., New York

BRANCH OFFICES

Munsey Bldg., Washington, D. C. 100 Boylston St., Boston, Mass.
Hegeman-Castle Corporation, Railway Exchange Building, Chicago, Ill.

RAILWAY SUPPLIES

Tool Steel Gears and Pinions
Anglo-American Varnish Co., Varnishes, Enamels, etc.
National Hand Holds
Genesco Paint Oils
Dunham Hopper Door Device
Garland Ventilators
Walter Tractor Snow Plows
Feasible Drop Brake Staffs
Ft. Pitt Spring & Mfg. Co., Springs
Flaxlinum Insulation
Economy Electric Devices Co. Power Saving and Inspection Meters
National Safety Devices Company's Whistle Blowers, Gong Ringers and Brake Hangers
Godward Gas Generators
Cowdry Automotive Brake Testing Machine

SPECIAL TRACKWORK

of the famous

TISCO MANGANESE STEEL

WM. WHARTON JR. & CO., INC.

EASTON, PA.

Sales Offices:

Boston Chicago El Paso Montreal New York Philadelphia Pittsburgh San Francisco Scranton

The DIFFERENTIAL CAR



Standard on 60 Railways for

Track Maintenance
Track Construction
Ash Disposal
Coal Hauling
Concrete Materials
Waste Handling
Excavated Materials
Hauling Cross Ties
Snow Disposal

Use These Labor Savers

Differential Crane Car
Clark Concrete Breaker
Differential 3-way Auto Truck Body
Differential Car Wheel Truck and Tractor

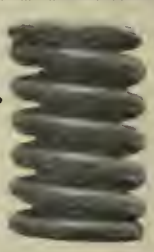
THE DIFFERENTIAL STEEL CAR CO., Findlay, O.



TAYLOR

Coil and Elliptic

SPRINGS



insure easy riding cars and reduce maintenance

TAYLOR ELECTRIC TRUCK CO.

TROY, N. Y., U. S. A.

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.

Positions Vacant and all other classifications, 8 cents a word, minimum charge $2.00.

Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.

Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

1 to 3 inches.....$4.50 an inch
4 to 7 inches..... 4.30 an inch
8 to 14 inches..... 4.10 an inch

Rates for larger spaces, or yearly rates, on request.

An *advertising inch* is measured vertically on one column, 3 columns—30 inches—to a page.

Over 6000 other men in the Electric Railway Field will see this page—

Then isn't this the logical place to advertise any business wants you may have of interest to Electric Railway men? Employment—Business—Equipment Opportunities, etc., etc.

FOR SALE

15 BIRNEY SAFETY CARS

Brill Built

West. 508 or G. E. 264 Motors

Cars Complete—Low Price—Fine Condition

ELECTRIC EQUIPMENT CO.

Commonwealth Bldg., Philadelphia, Pa.

WANTED

MOTORS

14—Second-hand Westinghouse 532 S.B: Motors.

The Steubenville, East Liverpool & Beaver Valley Traction Company

East Liverpool, Ohio

Keep your Eye on the

Searchlight Section

and your Advertisements in it

0197

POSITION VACANT

ADVERTISING man for city and interurban electric railway in the East. P-63, Electric Railway Journal, Tenth Ave. at 36th St., New York.

POSITIONS WANTED

A TECHNICALLY trained engineer with eleven years' experience studying schedules, traffic conditions and operating methods, desires to make a change. PW-67, Electric Railway Journal, 1600 Arch St., Philadelphia, Pa.

EXECUTIVE—Fifteen years' experience managing light, power and transportation properties. Open for other connections; personal reasons for desiring change. PW-69, Electric Railway Journal, Guardian Bldg., Cleveland, Ohio.

GENERAL superintendent or manager; fifteen years' successful experience. PW-55, Electric Railway Journal, Tenth Ave. at 36th St., New York.

SUPERINTENDENT, fifteen years' experience in city, interurban and bus transportation in foreign countries and United States; can speak Spanish. PW-68, Electric Railway Journal, Tenth Avenue at 36th St., New York.

SUPERINTENDENT equipment, M. M. efficiency; work unit cost production appointment wanted; highest personal references; 25 years' experience steam electric, stores; wide bus experience in London and U. S. A. and public relations; willing to go anywhere. PW-70, Electric Railway Journal, Tenth Ave. at 36th St., New York.

We buy entire Railways and Power Plants

H. E. SALZBERG COMPANY, Inc.

225 Broadway New York City

We sell Street Railway and Power equipment

Built A Little Better

It's the extra care we put into making Elliott-Thompson Coils that makes them better built.

Less hammering, less abuse; they slip into grooves. Coil life is longer. Labor and time are saved.

It's the result of 37 years of knowing how. Investigate.

The Elliott-Thompson Electric Co.

Ajax Bldg., Cleveland, Ohio



WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier Inc., Barron G.
Air Brakes
General Electric Co.
Westinghouse Air Brake Co.
Anchors, Guy
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Armature Shop Tools
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
Automatic Return Switch Stands
Ramapo Ajax Corp.
Automatic Safety Switch Stands
Ramapo Ajax Corp.
Axles
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Cincinnati Car Co.
St. Louis Car Co.
Standard Steel Works Co.
Taylor Electric Co.
Westinghouse E. & M. Co.
Axles, Front
Shuler Axle Co.
Axles, Steel
Bethlehem Steel Co.
Babbit Metal
National Bearing Metal Co.
Babbitting Devices
Columbia Machine Works & M. I. Co.
Badges and Buttons
Elec. Service Supplies Co.
International Register Co.
Barges, Steel
American Bridge Co.
Batteries, Dry
Nichols-Lintern Co.
Bearings, Anti-Friction
Hyatt Roller Bearing Co.
Bearings and Bearing Metals
Bemis Car Truck Co.
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
Drew Elec. & Mfg. Co.
Eureka Copper Products Co.
St. Louis Car Co.
National Bearing Metal Co.
Taylor Electric Co.
Westinghouse E. & M. Co.
Bearings, Center and Roller Side
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
Stucki Co., A.
Bearings, Roller
Hyatt Roller Bearing Co.
Bearings, Roller and Ball
Timken Roller-Bearing Co.
Bells & Buzzers
Consolidated Car Heating Co.
Bells and Gongs
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
St. Louis Car Co.
Benders, Rail
Railway Trackwork Co.
Bodies, Bus
Brill Co., The J. G.
Cummings Car & Coach Co.
Fitzjohn Mfg. Co.
St. Louis Car Co.
Body Material—Haskelite & Plymetl
Haskelite Mfg. Corp.
Boilers
Babcock & Wilcox Co.
Bond Testers
American Steel & Wire Co.
Elec. Service Supplies Co.
Bonding Apparatus
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Bonds, Rail
American Steel & Wire Co.
Drew Elec. & Mfg. Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.
Book Publishers
McGraw-Hill Book Co.
Brackets and Cross Arms (See also Poles, Ties, Posts, etc.)
American Bridge Co.
Columbia Machine Works & M. I. Co.
Electric Railway Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Brake Adjusters
Brill Co., The J. G.
Cincinnati Car Co.
National Railway Appliance Co.
Westinghouse Traction Br. Co.
Brake Shoes
American Brake Shoe & Foundry Co.
Bemis Car Truck Co.
Brill Co., The J. G.
St. Louis Car Co.
Taylor Electric Co.
Brake Testers
National Railway Appliance Co.
Brakes, Brake Systems and Brake Parts
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
General Electric Co.
National Brake Co.
St. Louis Car Co.
Taylor Electric Co.
Westinghouse Traction Brake Co.
Brakes, Magnetic Rail
Cincinnati Car Co.
Bridges, Steel
American Bridge Co.
Brushes, Carbon
Eureka Copper Products Co.
General Electric Co.
Westinghouse E. & M. Co.
Brushholders
Columbia Machine Works & M. I. Co.
Eureka Copper Prod. Co.
General Electric Co.
Buildings, Steel
American Bridge Co.
Bulkheads
Haskelite Mfg. Corp.
Bunkers, Coal
American Bridge Co.
Bus Lighting
National Railway Appliance Co.
Buses
Cummings Car & Coach Co.
International Harvester Co.
Yellow Truck & Coach Co.
Buses, Gas, Electric
General Electric Co.
Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
Cables (See Wires and Cables)
Cambric Tapes, Yellow and Black Varnished
General Electric Co.
Irvington Varnish & Ins. Co.
Mica Insulator Co.
Carbon Brushes (See Brushes, Carbon)
Car Lighting Fixtures
Elec. Service Supplies Co.
Car Panel Safety Switches
Consolidated Car Heating Co.
Westinghouse E. & M. Co.
Car Steps, Safety
Cincinnati Car Co.
Irving Iron Works
Car Wheels, Rolled Steel
Bethlehem Steel Co.
Co.
Cars, Dump
Brill Co., he J. G.
Differential Steel Car Co.
St. Louis Car Co.
Cars, Gas-Electric
Brill Co., The J. G.
General Electric Co.
Westinghouse Elec. & Mfg.
Cars, Gas, Rail
Brill Co., The J. G.
St. Louis Car Co.
Cars, Passenger, Freight, Express, etc.
Amer. Car Co.
Brill Co., The J. G.
Cincinnati Car Co.
Cummings Car & Coach Co.
Kuhlman Car Co., G. C.
St. Louis Car Co.
Wason Car Co.
Cars, Self-Propelled
Brill Co., The J. G.
Cars, Second Hand
Electric Equipment Co.
Castings, Brass Composition or Copper
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
Eureka Copper Prod. Co.
National Bearing Metal Co.
Castings, Gray Iron and Steel
American Bridge Co.
American Steel Foundries
Bemis Car Truck Co.
Columbia Machine Works & St. Louis Car Co.
Standard Steel Works Co. Inc.
Wm. Wharton, Jr. & Co.,
Castings, Malleable & Brass
Bemis Car Truck Co.
Columbia Machine Works & M. I. Co.
St. Louis Car Co.
Catchers and Retrievers, Trolley
Earll, C. I.
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.
Ceiling Car
Haskelite Mfg. Corp.
Ceilings, Plywood Panels
Haskelite Mfg. Corp.
Change Carriers
Cleveland Fare Box Co.
Electric Service Supplies Co.
Change Trays
Cincinnati Car Co.
Circuit-Breakers
General Electric Co.
Westingbouse E. & M. Co.
Clamps and Connectors for Wires and Cables
Electric Railway Equipment
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Cleavers
Oakite Products, Inc.
Cleaners and Scrapers, Track (See also Snow-Plows Sweepers and Brooms)
Brill Co., The J. G.
Cincinnati Car Cd.
St. Louis Car Co.
Coal and Ash Handling (See Conveying and Hoisting Machinery)
Coil Banding and Winding Machines
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
Westinghouse E. & M. Co.
Coils, Armature and Field
Columbia Machine Works & M. I. Co.
Elliot Thompson Co.
General Electric Co.
Westinghouse E. & M. Co
Coils, Choke and Kicking
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
Coin Changers
Illinois Motive Equipment Co.
Johnson Fare Box Co.
Coin Counting Machines
Cleveland Fare Box Co.
International Register Co.
Johnson Fare Box Co.
Coin Sorting Machines
Cleveland Fare Box Co.
Johnson Fare Box Co.
Coin Wrappers
Cleveland Fare Box Co.
Commutators, Parts
General Electric Co.
Commutator Slotters
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
Westinghouse E. & M. Co.
Wood Co., Chas. N.
Commotators or Parts
Columbia Machine Works & M. I. Co.
Eureka Copper Prod. Co.
General Electric Co.
Westinghouse E. & M. Co.
Compressors, Air
General Electric Co.
Sullivan Machinery Co.
Westinghouse Traction Br. Co.
Compressors, Gas
Sullivan Machinery Co.
Compressors, Portable
Sullivan Machinery Co.
Condensers
Westinghouse E. & M. Co.
Connectors, Solderless
Westinghouse E. & M. Co.
Connectors, Trailer Car
Columbia Machine Works & M. I. Co.
Consolidated Car Heating Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Controllers or Parts
Eureka Copper Prod. Co.
General Electric Co.
Westinghouse E. & M. Co.
Controller Regulators
Elec. Service Supplies Co.
Controlling Systems
General Electric Co.
Westinghouse E. & M. Co.
Converters, Rotary
General Electric Co.
Westinghouse E. & M. Co.
Conveying & Hoisting Machinery
American Bridge Co.
Copper Wire
American Brass Co.
American Steel & Wire Co.
Anaconda Copper Mining Co.
Copper Wire Instruments Measuring, Testing and Recording
American Brass Co.
American Steel & Wire Co.
Anaconda Copper Mining Co.
Cord, Bell, Trolley, Register
American Steel & Wire Co.
Brill Co., The J. G.
Elec. Service Supplies Co.
International Register Co.
Roehling's Sons Co., J. A.
St. Louis Car Co.
Samson Cordage Works
Cord Connectors and Couplers
Elec. Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.
Couplers, Car
American Steel Foundries
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
Ohio Brass Co.
Westinghouse Tr. Br. Co.
Cowl Ventilators
Nichols Lintern Co.
Cranes, Hoist and Lift
Electric Service Supplies Co.
Eureka Copper Prod. Co.
Cross Arms (See Brackets)
Crossing Foundations
International Steel Tie Co.
Crossing, Frog and Switch
Ramapo Ajax Corp.
Wm. Wharton,Jr.& Co., Inc.
Crossing Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton,Jr.& Co., Inc.
Crossings
Wm. Wharton Jr. & Co.,
Ramapo Ajax Corp. Inc.
Crossings, Track (See Track Special Work)
Crossings, Trolley
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Curtains & Curtain Fixtures
Brill Co., The J. G.
St. Louis Car Co.
Cutting Apparatus
General Electric Co.
Ohio Brass Co.
Railway Track Work Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.
Dealer's Machinery & Second Hand Equipment
Elec. Equipment Co.
Tacony Housing Corp.
Derailing Devices (See also Track Work)
Derailing Switches
Ramapo Ajax Corp.
Destination Signs
Columbia Machine Works & M. I. Co.
Electric Service Supplies Co.
Detective Service
Wish-Service, P. Edward
Door Operating Devices
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Heating Co.
National Pneumatic Co., Inc.
Doors and Door Fixtures
Brill Co., The J. G.
Cincinnati Car Co.
Hale-Kilburn Co.
St. Louis Car Co.
Safety Car Devices Co.
Doors, Folding Vestibule
National Pneumatic Co., Inc.
Drills, Rock
Sullivan Machinery Co.
Drills, Track
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Dryers, Sand
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Ears
Columbia Machine Works & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Electric Grinders
Railway Trackwork Co.
Electric Rivet Heaters
American Car & Foundry Motors Corp.
Electric Transmission Towers
American Bridge Co.
Electrical Wires and Cables
Amer. Electrical Works
American Steel & Wire Co.
Roebling's Sons Co., John A.
Electrodes, Carbon
Railway Trackwork Co.
Una Welding & Bonding Co.
Electrodes, Steel
Railway Trackwork Co.
Una Welding & Bonding Co.
Engineers, Consulting, Contracting and Operating
Beeler, John A.
J. Rowland Bibbins
Buchanan & Layng Corp.
Day & Zimmermann, Inc.
A. L. Drum & Co.
Faile & Co., E. H.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & DeLeuw
McClellan & Junkersfeld
McGovern, Halsey
Richey, Albert S.
Sanderson & Porter
Stevens & Wood, Inc.
Stone & Webster
White Eng. Corp., The J. G.
Engines, Gas, Oil or Steam
Waukesha Motor Corp.
Westinghouse E. & M. Co.
Exterior Side Panels
Haskelite Mfg. Corp.
Fare Boxes
Cleveland Fare Box Co.
Illinois Motive Equipment Co.
Johnson Fare Box Co.
Perey Mfg. Co., Inc.
Fare Registers
Electric Service Sup. Co.
Johnson Fare Box Co.
Fences, Woven Wire and Fence Posts
Acme Wire Co.
Amer. Steel & Wire Co.
Fenders and Wheel Guards
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Fender Co.
St. Louis Car Co.
Star Brass Works
Wood Co., Chas. N.
Fibre and Fibre Tubing
Westinghouse E. & M. Co.
Field Coils (See Coils)
Floodlights
Elec. Service Supplies Co.
General Electric Co.
Floor, Sub.
Haskelite Mfg. Corp.
Flooring, Fireproof
Irving Iron Works
Flooring, Non-Slipping
Irving Iron Works
Flooring, Open Steel
Irving Iron Works
Flooring, Steel, Subway
Irving Iron Works
Flooring, Ventilating
Irving Iron Works
Floors
Haskelite Mfg. Corp.
Forgings
Brill Co., The J. G.
Carnegie Steel Co.
Cincinnati Car Co.
Columbia Machine Works
Eureka Copper Prod. Co.
Standard Steel Works Co.
Frogs & Crossings, Tee Rail
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton,Jr.& Co., Inc.
Frogs, Track (See Track Work)
Frogs, Trolley
Electric Service Supplies Co
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Funnell Castings
Wm. Wharton, Jr. & Co., Inc.
Furnaces, Electric, Steel, Melting
American Bridge Co.
Fuses and Fuse Boxes
Columbia Machine Works & M. I. Co.
Consolidated Car Heating Co.
General Electric Co.
Westinghouse E. & M. Co.
Garage Equipment
Columbia Machine Works & M. I. Co.
Westinghouse Tr. Br. Co.
Gas Electric Drive for Buses & Trucks
General Electric Co.
Gasoline
Standard Oil Co. of Indiana
Texas Company
Gas Producers
Westinghouse E. & M. Co.
Gates, Car
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
Gear Blanks
Bethlehem Steel Co.
Carnegie Steel Co.
Brill Co., The J. G.
Standard Steel Works Co.
Gear Cases
Chillingworth Mfg. Co.
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

(Continued on page 58)



Use AIMco

Electric Railway Automatic Signals for Accessibility and Reliability

"American" AIMco INSULATING MACHINERY COMPANY

521 Huntington St.
Philadelphia, Pa. 1



Boyerized Parts:

Brake Pins
Brake Hangers
Brake Levers
Pedestal Oibs
Brake Fulcrums
Turnbuckles
Center Bearings
Side Bearings
Spring Post Bushings
Spring Posts
Bolster and Transom Chafing Plates
Manganese Brake Heads
Manganese Truck Parts
Bushings
Bronze Bearings
McArthur Turnbuckles

Can be purchased through the following representatives:

Economy Electric Devices Co.
72 W. Van Buren St., Chicago, Ill.
F. F. Rodier,
903 Monsdnock Bldg., San Francisco, Cal.
W. F. McKenney,
54 First Street, Portland, Oregon.
J. H. Denton,
1328 Broadway, New York City, N. Y.
A. W. Arlin,
519 Delta Bldg., Los Angeles, Cal.

Bemis Car Truck Company
Springfield, Mass.



Type R-11
Double Register

International Registers

Made in single and double types to meet requirements of service. For hand or foot, mechanical or electric operation. Counters, car fittings, conductors' punches.

The International Register Co.
15 South Throop Street, Chicago, Illinois

Kalamazoo Trolley Wheels

The value of Kalamazoo Trolley Wheels and Harps has been demonstrated by large and small electric railway systems for a period of thirty years. Being exclusive manufacturers, with no other lines to maintain, it is through the high quality of our product that we merit the large patronage we now enjoy. With the assurance that you pay no premium for quality we will appreciate your inquiries.



THE STAR BRASS WORKS
KALAMAZOO, MICH., U. S. A.

RAILWAY UTILITY COMPANY

CAR COMFORT WITH UTILITY
HEATERS
REGULATORS
VENTILATORS

2241-2247 Indiana St.
Chicago, Ill.

Write for Catalogue

1328 Broadway
New York, N.

Efficient Bus Heating
with
The N-L Venti-Duct Heater

THE NICHOLS-LINTERN CO.
7960 Lorain Ave. Cleveland, Ohio

ILLINOIS MOTIVE EQUIPMENT COMPANY

J. D. Elsom, President
General Sales Agent—The Air Rectifier
District Representatives
Johnson Fare Box; McCloskey Bomb Shell Torch;
Cinch Vertical Swipe; Fyr-Fly Spot Light
35 E. Wacker Drive Chicago, Illinois





CHILLINGWORTH
One-Piece Gear Cases

Seamless—Riveiless—Light Weight
Best for Service — Durability and Economy. *Write Us.*

Chillingworth Mfg. Co.
Jersey City, N. J.

H B LIFE GUARDS
PROVIDENCE FENDERS

Manufactured by
CONSOLIDATED CAR FENDER CO., PROVIDENCE, R. I.
General Sales Agents
WENDELL & MacDUFFIE CO., 110 E. 42nd St., N. Y. C.

PS HEATERS

Car Heating and Ventilating

—are no longer operating problems. We can show you how to take care of both with one equipment. The Peter Smith Forced Ventilation Hot Air Heater will save. In addition, 40% to 60% of the cost of any other car heating and ventilating system Write for details

The Peter Smith Heater Company
6209 Hamilton Ave., Detroit, Mich.



STUCKI SIDE BEARINGS

A. STUCKI CO.
Oliver Bldg.
Pittsburgh, Pa.

Gears and Pinions
Bemis Car Truck Co.
Bethlehem Steel Co.
Columbia Machine Works & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
National Railway Appliance Co.
R. D. Nuttall Co.
Tool Steel Gear & Pinion Co.

Generators
General Electric Co.
Leece-Neville Co., The
Westinghouse E. & M. Co.

Girder Rails
Bethlehem Steel Co.
Lorain Steel Co.

Gongs (See Bells and Gongs)

Grating, Steel, Subway
Irving Iron Works

Grease
Texas Company

Grinders and Grinding Supplies
Metal & Thermit Welding Co.
Railway Trackwork Co.

Grinders, Portable
Railway Trackwork Co.

Grinders, Portable Electric
Railway Trackwork Co.

Grinding Bricks and Wheels
Railway Trackwork Co.

Guard Rail Clamps
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co., Inc.

Guard Rails, Tee Rail and Manganese
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co., Inc.

Guards, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.

Harps, Trolley
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
General Electric Co.
National Bearing Metal Co.
R. D. Nuttall Co.
Star Brass Works

Headlights
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

Headlining
Columbia Machine Works & M. I. Co.
Haskelite Mfg. Corp.

Heaters, Bus
Nichols-Lintern Co.

Heaters, Car (Electric)
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter

Heaters, Car, Hot Air and Water
Smith Heater Co., Peter

Heaters, Car, Stove
Smith Heater Co., Peter

Heaters, Electric Rivet
American Car & Foundry Motors Corp.

Helmets—Welding
Railway Trackwork Co.
Una Welding & Bonding Co.

Hoists and Lifts
Columbia Machine Works & M. I. Co.
Ford Chain Block & M. Co.

Hoists, Portable
Sullivan Machinery Co.

Hose, Bridges
Ohio Brass Co.

Hose, Pneumatic
Westinghouse Traction Brake Co.

Ignition Units
Leece-Neville Co., The

Industrial Tractors
International Harvester Co.

Instruments, Measuring, Testing and Recording
American Steel & Wire Co.
General Electric Co.
National Railway Appliance Co.
Westinghouse E. & M. Co.

Insulating Cloth, Paper and Tape
General Electric Co.
Irvington Varnish & Ins. Co.
Mica Insulator Co.
Okonite Co.
Okonite-Callender Cable Co. Inc.
Westinghouse E. & M. Co.

Insulating Silk
Irvington Varnish & Ins. Co.

Insulating Varnishes
Irvington Varnish & Ins. Co.

Insulation (See also Paints)
Electric Railway Equipment Co.
Electric Service Sup. Co.
Irvington Varnish & Ins. Co.
Mica Insulator Co.
Okonite Co.
Okonite-Callender Cable Co. Inc.
Westinghouse E. & M. Co.

Insulation Slot
Irvington Varnish & Ins. Co.

Insulator Pins
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Insulators (See also Line Material)
Electric Railway Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hemingray Glass Co.
Irvington Varnish & Ins. Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Interior Side Linings
Haskelite Mfg. Corp.

Interurban Cars (See Cars Passenger, Freight Express etc.)

Jacks (See also Cranes, Hoists and Lifts)
Columbia Machine Wks.
Elec. Service Supplies Co.
Oil Jack Co.

Joints, Rail (See Rail Joints)

Journal Boxes
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.

Lamps, Guards and Fixtures
Elec. Service Sup. Co.
Westinghouse E. & M. Co.

Lamps, Arc and Incandescent (See also Headlights)
General Electric Co.
Westinghouse E. & M. Co.

Lamps, Signal and Marker
Elec. Service Supplies Co.
Nichols-Lintern Co.

Lanterns, Classification
Nichols-Lintern Co.

Letter Boards
Haskelite Mfg. Corp.
Nichols-Lintern Co.
Cincinnati Car Co.

Lighting Fixtures, Interior
Electric Service Supplies

Lighting Systems
Leece-Neville Co., The

Lightning Protection
Electric Service Sup. Co.
General Electric Co.
Westinghouse E. & M. Co.

Line Material (See also Brackets, Insulators, Wires, etc.
Electric Railway Equipment Co.
Electric Service Sup. Co.
Eureka Copper Prod. Co.
General Electric Co.
Hubbard & Co.
National Bearing Metal Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Locking Spring Boxes
Wm. Wharton, Jr. & Co., Inc.

Locomotives, Electric
Cincinnati Car Co.
Cummings Car & Coach Co.
General Electric Co.
St. Louis Car Co.
Westinghouse E. & M. Co

Lubricating Engineers
Standard Oil Co. of Indiana
Universal Lubricating Co.

Lubricants, Oil and Grease
Standard Oil Co. of Indiana
Texas Company
Universal Lubricating Co.

Manganese Paris
Bemis Car Truck Co.

Machinery, Insulating
Amer. Insulating Mach. Co.

Manganese Steel Castings
Wm. Wharton, Jr. & Co., Inc.

Manganese Steel Guard Rails
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co., Inc.

Manganese Steel, Special Track Works
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co., Inc.

Manganese Steel Switches, Frogs and Crossings
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co., Inc.

Mica
Mica Insulator Co.

Mirrors, Inside and Outside
Cincinnati Car Co.

Motor Buses (See Buses)

Motors, Generators & Controls for Gas Electric Buses
General Electric Co.

Motors, Electric
General Electric Co.
Westinghouse E. & M. Co.

Motorman's Seats
Brill Co., The J. G.
Cincinnati Car Co.
Electric Service Sup. Co.
Hale-Kilburn Co.
St. Louis Car Co.
Wood Co., Chas. N.

Nuts and Bolts
Bemis Car Truck Co.
Bethlehem Steel Co.
Cincinnati Car Co.
Hubbard & Co.

Oil
Texas Company

Oil Purifiers
De Laval Separator Co.

Omnibuses (See Buses)

Ovens
Young Brothers

Oxy-Acetylene (See Cutting Apparatus)

Packing
Westinghouse Traction Brake Co.

Paints and Varnishes
Electric Service Sup. Co.
Irvington Varnish & Ins. Co.
Mica Insulator Co.

Paints & Varnishes, Railway
National Ry. Appliance Co.

Panels, Outside, Inside
Haskelite Mfg. Corp.

Pavement Breakers
Sullivan Machinery Co.

Pickups, Trolley Wire
Drew Elec. & Mfg. Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Pinion Pollers
Drew Elec. & Mfg. Co.
Elec. Service Supplies Co.
Wood Co., Chas. N.

Pinions (See Gears)

Pins, Case Hardened, Wood and Iron
Bemis Car Truck Co.
Ohio Brass Co.
Westinghouse Tr. Brake Co.

Pipe Fittings
Standard Steel Works Co.
Westinghouse Tr. Brake Co.

Planers (See Machine Tools)

Plates for Tee Rail Switches
Ramapo Ajax Corp.

Pliers, Rubber Insulated
Electric Service Sup. Co.

Plywood (Roofs, Headlining Floors, Interior Panels, Bulkheads, Truss Planks)
Haskelite Mfg. Corp.

Pneumatic Tools
Ingersoll-Rand Co.

Pole Line Hardware
Bethlehem Steel Co.
Electric Service Sup. Co.
General Electric Co.
Ohio Brass Co.

Poles, Metal Street
Bates Steel Co., Walter
Electric Railway Equipment Co.
Hubbard & Co.
Union Metal Mfg. Co.

Pole Reinforcing
Hubbard & Co.

Poles, Ties, Posts, Piling and Lumber
American Creosoting Co.
Bell Lumber Co.
International Creosoting Co.
Naugle Pole & Tie Co.
J. F. Prettyman & Son

Poles & Ties, Treated
American Creosoting Co.
Bell Lumber Co.
International Creosoting Co.

Poles, Trolley
Bell Lumber Co.
Electric Service Sup. Co.
R. D. Nuttall Co.

Poles, Tubular Steel
Electric Railway Equipment Co.
Electric Service Sup. Co.

Potheads
Okonite Co.
Okonite-Callender Cable Co. Inc.

Power Houses
American Bridge Co.

Power Saving Devices
National Railway Appliance Co.

Pressings, Special Steel
Cincinnati Car Co.

Pressure Regulators
General Electric Co.
Westinghouse E. & M. Co.
Westinghouse Traction Brake Co.

Pumps, Air Lift
Sullivan Machinery Co.

Pumps, Vacuum
Sullivan Machinery Co.

Punches, Ticket
International Register Co.
Wood Co., Chas. N.

Rail Braces and Fastenings
Ramapo Ajax Corp.

Rail Grinders (See Grinders)

Rail Joints
Carnegie Steel Co.

Rail Joints—Welded
Lorain Steel Co.
Metal & Thermit Welding Co.

Rails, Steel
Bethlehem Steel Co.
Carnegie Steel Co.

Rail Welding
Metal & Thermit Welding Co.
Railway Trackwork Co.
Una Welding & Bonding Co.

Railway Safety Switches
Consolidated Car Heating Co
Westinghouse E. & M. Co.

Rattan
Brill Co., The J. G.
Cummings Car & Coach Co.
Electric Service Sup. Co.
Hale-Kilburn Co.
St. Louis Car Co.

Registers and Fittings
Brill Co., The J. G.
Cincinnati Car Co.
Electric Service Sup. Co.
International Register Co.
St. Louis Car Co.

Reinforcement, Concrete
Amer. Steel & Wire Co.
Bethlehem Steel Co.
Carnegie Steel Co.

Repair Shop Appliances (See also Coil Banding and Winding Machines)
Elec. Service Supplies Co.

Repair Work (See also Coils)
Westinghouse E. & M. Co.

Replacers, Car
Cincinnati Car Co.
Electric Service Sup. Co.

Resistances
Consolidated Car Heating Co
General Electric Co.

Resistance, Wire and Tube
American Steel & Wire Co.
Westinghouse E. & M. Co.

Retrievers, Trolley (See Catchers and Retrievers, Trolley)

Rheostats
General Electric Co.
Mica Insulator Co.
Westinghouse E. & M. Co.

Rivet Heaters, Electric
American Car & Fdry Motors Corp.

Roofing, Car
Haskelite Mfg. Corp.

Roofs, Car & Bus
Haskelite Mfg. Corp.

Sanders, Track.
Brill Co., The J. G.
O. M. Edwards Co., Inc.
Electric Service Sup. Co.
Nichols-Lintern Co.
Ohio Brass Co.
St. Louis Car Co.

Sash Fixtures, Car
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.

Sash, Metal, Car Window
Hale-Kilburn Co.

Scrapers, Track (See Cleaners and Scrapers, Track)

Screw Drivers, Rubber Insulated
Electric Service Sup. Co.

Seating Materials
Brill Co., The J. G.
Fitzjohn Mfg. Co.
Hale-Kilburn Co.
Haskelite Mfg. Corp.
St. Louis Car Co.

Seats, Bus
Brill Co., The J. G.
Hale-Kilburn Co.
St. Louis Car Co.

Seats, Car (See also Rattan)
Brill Co., The J. G.
Cincinnati Car Co.
Hale-Kilburn Co.
St. Louis Car Co.

Second Hand Equipment
Electric Equipment Co.
Tacony Housing Corp.

Shades, Vestibule
Brill Co., The J. G.
Cincinnati Car Co.

Shovels
Brill Co., The J. G.
Hubbard & Co.

Shovels, Power
Brill Co., The J. G.

Side Bearings (See Bearing Center and Side)

Signals, Car Starting
Consolidated Car Heating Co
Electric Service Sup. Co.
National Pneumatic Co., Inc.

Signals, Indicating
Nichols-Lintern Co.

Signal Systems, Block
Electric Service Sup. Co.
Nachod & U. S. Signal Co.
Wood Co., Chas. N.

Signal Systems, Highway Crossing
Nachod & U. S. Signal Co.

Signals, Warning
American Stombos Co.

Slack Adjusters (See Brake Adjusters)

Slag
Carnegie Steel Co.

Sleet Wheels and Cutters
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Eureka Copper Products Co.
National Bearing Metal Co.
R. D. Nuttall Co.

Smokestacks, Car
Nichols-Lintern Co.

Snow Plows
National Railway Appliance Co.

Snow-Plows, Sweepers and Brooms
Brill Co., he J. G.
Columbia Machine Works & M. I. Co.
Consolidated Car Fender Co.
Cummings Car & Coach Co.
St. Louis Car Co.

Snow Sweeper, Rattan
J. G. Brill Co.

Soldering and Brazing Apparatus (See Welding Processes and Apparatus)

Special Adhesive Papers
Irvington Varnish & Ins. Co.

Special Trackwork
Bethlehem Steel Co.
Wm. Wharton, Jr. & Co., Inc.
Lorain Steel Co.

Spikes
American Steel & Wire Co.

Splicing Compounds
Westinghouse E. & M. Co.

Splicing Sleeves (See Clamps and Connectors)

Springs
National Railway Appliance Co.

Springs, Car and Truck
American Spiral Spring Co.
American Steel Foundries
Amer. Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
Standard Steel Works Co.
Taylor Electric Co.

Sprinklers, Track and Road
Brill Co., The J. G.
Cummings Car & Coach Co.
St. Louis Car Co.

Stair Steps, Safety
Irving Iron Works

Steel and Steel Products
American Steel & Wire Co.
Carnegie Steel Co.

Steps, Car
Brill Co., The J. G.
Cincinnati Car Co.
Irving Iron Works

Stokers, Mechanical
Babcock & Wilcox Co.
Westinghouse E. & M. Co.

Stop Signals
Nichols-Lintern Co.

Storage Batteries (See Batteries, Storage)

Strain, Insulators
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Strand
American Steel & Wire Co.
Roeblings Sons Co., J. A.

Street Cars (See Cars, Passenger, Freight, Express, etc.)

Superheaters
Babcock & Wilcox Co.

Sweepers, Snow (See Snow Plows, Sweepers and Brooms)

Switch Stands and Fixtures
Ramapo Ajax Corp.

Switches
Eureka Copper Products Co.
General Electric Co.

Switches, Selector
Nichols-Lintern Co.

Switches and Switchboards
Consolidated Car Heating Co.
Electric Service Sup. Co.
Westinghouse E. & M. Co.

Switches, Tee Rail
Ramapo Ajax Corp.

Switches, Track (See Track Special Work)

Tampers, Tie
Railway Trackwork Co.

Tapes and Cloths (See Insulating Cloth, Paper and Tape)

Tee Rail Special Track Work
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co., Inc.

Telephones and Parts
Electric Service Sup. Co.

Telephone & Telegraph Wire
American Steel & Wire Co.
J. A. Roeblings Sons Co.

Testing Instruments (See Instruments, Electrical Measuring, Testing, etc.)

Thermostats
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter

Ticket Choppers & Destroyers
Electric Service Sup. Co.

Ties and Tie Rods, Steel
American Bridge Co.
Carnegie Steel Co.
International Steel Tie Co.

Ties, Wood Cross (See Poles Ties, Posts, etc.)

Tires
General Tire Co.
Kelly Springfield Tire Co.

Tokens
Johnson Fare Box Co.

Tongue Switches
Wm. Wharton, Jr. & Co., Inc.

(Continued on page 60)

"The Standard for Rubber Insulation"

INSULATED WIRES and CABLES

"Okonite," "Manson," and Dundee "A" "B" Tapes

Send for Handbook

The Okonite Company

The Okonite-Callender Cable Company, Inc.

Factories, PASSAIC, N. J. PATERSON, N. J.

Sales Offices: New York Chicago Pittsburgh St. Louis Atlanta Birmingham San Francisco Los Angeles Seattle

Pettingell-Andrews Co., Boston, Mass.
F. D. Lawrence Electric Co., Cincinnati, O.
Novelty Electric Co., Phila., Pa.

Gen. Rep.: Engineering Materials Limited, Montreal.
Cuban Rep.: Victor G. Mendoza Co., Havana.



FARE
BOXES for BUSES

Let us tell you of this especially designed box for this class of service.

The Cleveland Fare Box Co.
4900 Lexington Ave., Cleveland, O.
Canadian Cleveland Fare Box Co., Ltd.
Preston, Ontario

COIN COUNTING And Sorting Machines CHANGE CARRIERS Tokens

Arc Weld Rail Bonds

AND ALL OTHER TYPES

Descriptive Catalogue Furnished

American Steel & Wire Company

New York Boston Pittsburgh
Chicago Cleveland Denver
U. S. Steel Products Co
San Francisco Los Angeles Portland Seattle

AMERICAN ELECTRICAL WORKS — AMELECTRIC — Wires and Cables — PHILLIPSDALE, R.I.

Reg. U. S. Pat. Office

AMELECTRIC PRODUCTS

BARE COPPER WIRE AND CABLE

TROLLEY WIRE

WEATHERPROOF WIRE AND CABLE

PAPER INSULATED UNDERGROUND CABLE

MAGNET WIRE

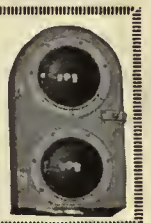
AMERICAN ELECTRICAL WORKS
PHILLIPSDALE, R. I.

Chicago, 20-32 West Randolph Street.
Cincinnati, Traction Bldg.: New York, 100 E. 42nd St.

NAUGLE POLES
WESTERN & NORTHERN CEDAR
NAUGLE POLE & TIE CO.
59 E. MADISON ST. CHICAGO ILL.
New York · Columbus · Kansas City · Spokane · Vancouver · Boston

Chapman Automatic Signals

Charles N. Wood Co., Boston



GOLD CAR HEATING & LIGHTING CO.

220 36th St., Brooklyn, N. Y.

ELECTRIC HEATERS WITH OPEN COIL OR ENCLOSED ELEMENTS
THERMOSTAT CONTROL—VENTILATORS
WRITE FOR NEW CATALOGUE

ANACONDA from mine to consumer

Rod, Wire and Cable Products

ANACONDA COPPER MINING COMPANY
THE AMERICAN BRASS COMPANY
General Offices - - 25 Broadway, New York

ANACONDA TROLLEY WIRE

HUBBARD

Hubbard and COMPANY

PITTSBURGH OAKLAND CHICAGO

BELL
NORTHERN CEDAR POLES WESTERN

BUTT TREATING ALL GRADES TIES

BELL LUMBER CO., *Minneapolis, Minn.*

PRETTYMAN PRESERVED P27 FOREST PRODUCTS

CREOSOTED

Railroad Cross-ties; Switch-ties; Bridge Timbers; Construction Timbers; Mine Timbers; Lumber; Piling; Poles; Posts and other Forest Products

J. F. Prettyman & Sons
Wood Preserving Plant
Charleston, S. C.

SAMSON SPOT WATERPROOFED TROLLEY CORD



Trade Mark Reg. U. S. Pat. Off.

Made of extra quality stock firmly braided and smoothly finished
Carefully inspected and guaranteed free from flaws.
Samples and information gladly sent.

SAMSON CORDAGE WORKS, BOSTON, MASS.

ALPHABETICAL INDEX TO ADVERTISEMENTS

	Page
Acme Wire Co., The	47
American Brass Co., The	59
American Bridge Co.	54
American Car Co.	61
American Car & Foundry Motors Corp.	Insert 11-12-13-14
American Creosoting Co.	37
American Electrical Works	59
American Insulating Mach. Co.	57
American Steel & Wire Co.	59
American Steel Foundries	6
American Strombos Co., The	51
American Spiral Spring Mfg. Co.	Insert 1112b
Anaconda Copper Mining Co.	59
Babcock & Wilcox Co.	53
Bates Exp. Steel Truss Co.	53
Beeler Organization, The	52
Bell Lumber Co.	59
Bemis Car Truck Co.	57
Bethlehem Steel Co.	54
Bibbins, J. Rowland	53
Bridgeport Brass Co.	20
Brill Co., The J. G.	61
Buchanan & Layng Corporation	52
Carnegie Steel Co.	51
Chillingworth Mfg. Co.	57
Cincinnati Car Co.	16-17
Cleveland Fare Box Co., The	59
Collier, Inc., Barron G.	Front Cover
Columbia Machine Works & M. I. Co., The	48
Consolidated Car Fender Co., The	57
Consolidated Car Heating Co.	53
Cummings Car & Coach Co.	8
Dayton Mechanical Tie Co.	Insert 43-44
Day & Zimmermann, Inc.	52
De Laval Separator Co.	41
Differential Steel Car Co., The	54
Drum & Co., A. L.	52
Earll, C. I.	48
Electric Equipment Co.	55
Electric Railway Equipment Co.	49
Electric Service Supplies Co.	9
Elliott-Thompson Electric Co., The	55
Faile & Co., E. H.	52
Fitzjohn Mfg. Co.	29
Ford, Bacon & Davis, Inc.	52
Ford Chain Block Co.	Insert 1112b
"For Sale" Ads	55
General Electric Co.	22, Back Cover
General Tire Co., The	26b
Gold Car Heating & Ltg. Co.	59
Graham Bros.	30-31
Griffin Wheel Co.	48
Hale & Kilburn Co.	32
Haskelite Mfg. Corp.	60
"Help Wanted" Ads	55
Hemingway Glass Co.	50
Hemphill & Wells	52
Holst, Englehardt W.	52
Hubbard & Co.	59
Hyatt Roller Bearing Co.	34
Illinois Motive Equipment Co.	57
International Creosoting & Constr. Co.	39
International Harvester Co.	27
International Oxygen Co.	60
International Register Co.	57
International Steel Tie Co.	7
Irving Iron Works Co.	38
Irvington Varnish & Insulator Co.	53
Jackson, Walter	52
Johnson Fare Box Co.	50
Kerite Insulated Wire & Cable Co.	51
Kelker, DeLeuw & Co.	53
Kelly-Springfield Tire Co.	26
Kuhlman Car Co.	61
Leece-Neville Co., The	28
Lorain Steel Co., The	54
McCardell Co., J. R.	49
McClellan & Junkersfeld	52
McGovern, Halsey	52
McGraw-Hill Book Co., The	46
Mica Insulator Co.	51
Metal & Thermit Corp.	21
Nachod and United States Signal Co., Inc.	49
National Bearing Metals Corp.	50
National Brake Co., Inc.	23
National Pneumatic Co.	15
National Railway Appliance Co.	54
Naugle Pole & Tie Co.	59
Nichols-Lintern Co., The	57
Nuttall Co., R. D.	42
Oakite Products, Inc.	46
Ohio Brass Co.	5
Okonite-Callender Cable Co., Inc., The	59
Okonite Co., The	59
Perey Mfg. Co., Inc.	52
Positions Wanted and Vacant	55
Prettyman & Sons, J. F.	50
Railway Track-work Co.	4
Railway Utility Co.	57
Ramapo-Ajax Co.	57
Richey, Albert S.	52
Roebling's Sons Co., John A.	53
St. Louis Car Co.	18-19
Salzburg Co., Inc., H. E.	55
Samson Cordage Works	59
Sanderson & Porter	52
Searchlight Section	55
Shuler Axle Co.	47
Smith Heater Co., Peter	57
Standard Oil Co.	36
Standard Steel Works Co.	45
Star Brass Works	57
Steubenville, East Liverpool & Beaver Valley Traction Co.	55
Stevens & Wood, Inc.	52
Stone & Webster	52
Stucki Co., A.	57
Sullivan Machinery Co.	46
Taylor Electric Truck Co.	54
Texas Co., The	35
Tool Steel Gear & Pinion Co.,	Insert 1112a
Una Welding & Bonding Co.	53
Unvereal Lubricating Co.	53
"Want" Ads	55
Wason Mfg. Co.	61
Waukesha Motor Co.	33
Westinghouse Electric & Mfg. Co.	2
Westinghouse Traction Brake Co.	10
Wharton, Jr. & Co., Wm.	54
"What and Where to Buy"	56-58-60
White Engineering Corp., J. G.	52
Willard Storage Battery Co.	26a
Wish Service, The P. Edw.	53
Wood Co., Chas. N.	59
Yellow Truck & Coach Mfg. Co.,	24-25
Young Bros.	Insert 1112b

WHAT AND WHERE TO BUY—Continued from page 58

Tool Steel
Bethlehem Steel Co.
Carnegie Steel Co.

Tools, Track & Miscellaneous
Amer. Steel & Wire Co.
Columbia Machine Works & M. I. Co.
Electric Service Sup. Co.
Hubbard & Co.
Railway Trackwork Co.

Torches, Acetylene (See Cutting Apparatus)

Towers and Transmission Structures
Bates Exp. Steel Corp.
Westinghouse E. & M. Co.

Tower Wagons & Transmission Structures
MacCardell & Co., J. R.

Track Expansion Joints
Wm. Wharton, Jr & Co., Inc.

Track Grinders
Metal & Thermit Welding Co.
Railway Trackwork Co.
Ramapo Ajax Corp.
Una Welding & Bonding Co.

Track, Special Work
Bethlehem Steel Co.
Columbia Machine Works & M. I. Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co., Inc.

Trackless Trolley Cars
Brill Co., The J. G.
St. Louis Car Co.

Transfer Tables
American Bridge Co.

Transfers (See Tickets)

Transformers
General Electric Co.
Westinghouse E. & M. Co.

Transmission Towers, Structures
American Bridge Co.

Treads Safety Stair Car Step
Cincinnati Car Co.
Irving Iron Works

Tree, Wire
Okonite Co.
Okonite-Callender Cable Co.

Trolley Bases
National Bearing Metal Co.
R. D. Nuttall Co.
Ohio Brass Co.

Trolley Bases, Retrieving
R. D. Nuttall Co.
Ohio Brass Co.

Trolley Buses
Brill Co., The J. G.
Westinghouse E. & M. Co.

Trolley Material (Overhead)
Electric Service Sup. Co.
General Electric Co.
National Bearing Metal Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Trolley Wheel Bushings
National Bearing Metal Co.
Star Brass Works

Trolley Wheels (See Wheels, Trolley)

Trolley Wire
American Brass Co.
Amer. Electrical Works
American Steel Foundries
Amer. Steel & Wire Co.
Anaconda Copper Min. Co.
Bridgeport Brass Co.
Roeblings Sons Co., J. A.

Trolleys and Trolley Systems
Ford Chain Block & M. Co.

Trucks, Car
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Cummings Car & Coach Co.
St. Louis Car Co.
Taylor Electric Co.

Trucks, Motor
International Harvester Co.

Truss Planks
Haskelite Mfg. Corp.

Tubing, Yellow and Black Flexible Varnish
Irvington Varnish & Ins. Co.

Turbine, Steam
General Electric Co.
Westinghouse E. & M. Co.

Turnstiles
Electric Service Sup. Co.
Perey Mfg. Co., Inc.

Turntables
American Bridge Co.
Electric Service Supplies Co.

Valves
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Varnished Papers and Silks
Irvington Varnish & Ins. Co.

Ventilators
National Ry. Appliance Co.

Ventilators, Car
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Heating Co.
Nichols-Lintern Co.
Railway Utility Co.
St. Louis Car Co.

Vestibule Linings
Haskelite Mfg. Corp.

Welded Rail Joints
Lorain Steel Co., The
Metal & Thermit Corp.
Railway Trackwork Co.
Una Welding & Bonding Co.

Welders, Portable Electric
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Welders, Rail Joint
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.

Welding Processes and Apparatus
Metal & Thermit Welding Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Welding Steel
Railway Trackwork Co.
Una Welding & Bonding Co.

Welding Wire
American Steel & Wire Co.
Railway Trackwork Co.
Roebling's Sons Co., J. A.

Welding Wire and Rods
Railway Trackwork Co.

Wheel Guards (See Fenders and Wheel Guards)

Wheel Presses (See Machine Tools)

Wheels, Car, Cast Iron
Griffin Wheel Co.

Wheels, Car Steel & Steel Tire
American Steel Foundries
Bemis Car Truck Co.
Carnegie Steel Co.
Standard Steel Works Co.

Wheels, Trolley
Columbia Machine Works & M. I. Co.
National Bearing Metal Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Eureka Copper Prod. Co.
R. D. Nuttall Co.
Star Brass Works

Wheels, Wrought Steel
Carnegie Steel Co.

Whistles, Air
Ohio Brass Co.
Westinghouse E. & M. Co.
Westinghouse Traction Brake Co.

Window Guards & Fittings
Cincinnati Car Co.

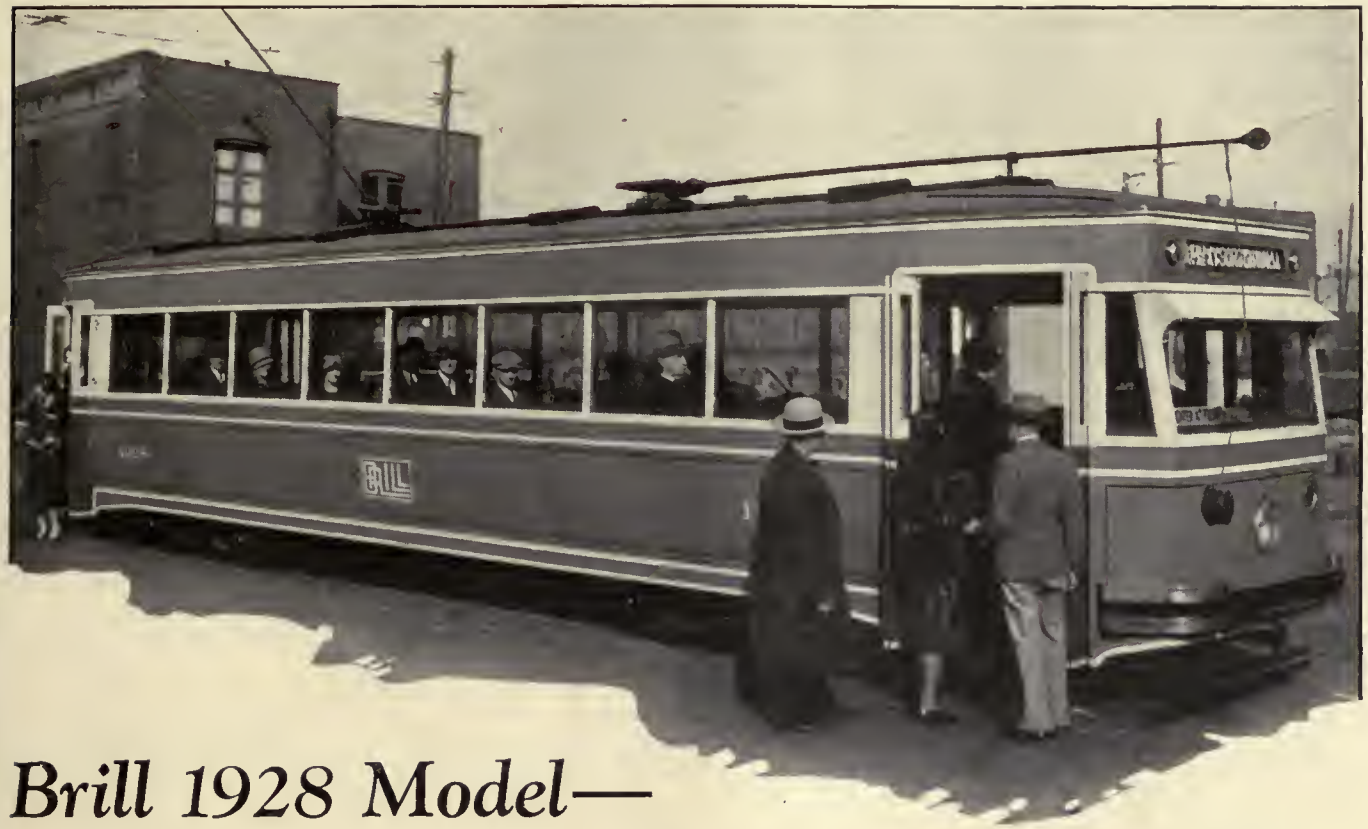
Wire Rope
Amer. Steel & Wire Co.
Roebling's Sons Co., J. A.

Wires and Cables
Acme Wire Co.
American Brass Co.
Amer. Electrical Works
Amer. Steel & Wire Co.
Anaconda Copper Min. Co.
Bridgeport Brass Co.
General Electric Co.
Kerite Insulated Wire and Cable Co.
Okonite Co.
Okonite-Callender Cable Co.
Roebling's Sons Co., J. A.
Westinghouse E. & M. Co.

Wood Preservatives
American Creosoting Co.

HASKELITE ROOFS
Haskelite Manufacturing Corporation,
133 West Washington Street, Chicago
PLYMETL SIDE PANELS

INDUSTRIAL GASES
ACETYLENE
OXYGEN
I.O.C. SYSTEM
HYDROGEN
NITROGEN
Quick shipment and low prices also on cylinders, valves, torches, regulators and supplies.
International Oxygen Co., Main Offices: Newark, N. J.
Branches: New York Pittsburgh Toledo



Brill 1928 Model—
for Riders and Revenue

The popular acclaim given the Brill 1928 Model Electric Car upon its first public introduction indicates to some extent at least that it appeals to the car rider. Its low racy appearance, beautiful interior, full vision windows and seat comfort came in for their share of approval.

After all, what does it all mean? A type of rolling stock which appeals to the public is sure to show results in revenue. The public is pleased, and as a result the operating company enjoys the larger return on their investment to which they are entitled.

Somehow or other the public will ride. The Brill 1928 Model Electric Car is so designed and equipped that the electric railways placing it in service will be prepared to furnish the kind of service the public wants and will use. For riders and revenue—the twofold purpose of the Brill 1928 Model.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.
AMERICAN CAR CO. ST. LOUIS MO. — G.C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.

GAS-ELECTRIC DRIVE

After a Hard Winter



AFTER a hard winter, with its strains and heavy going, bus operators find their Gas-Electrics in much better shape than the mechanical-drive buses. This means lower maintenance and depreciation.

Abuse such as racing, stalling, or jerky applications of power is impossible with Gas-Electric drive.

Gas-Electric equipment is now available in three standard sizes—for light and medium duty in city and interurban service, and double-deck for city operation.

GENERAL ELECTRIC

ELECTRIC RAILWAY JOURNAL

y-Hill Publishing Company, Inc. DECEMBER 24, 1927 Twenty Cents per Copy

HOUSTON, TEXAS.

TIMKEN *Tapered Roller* BEARINGS



Timken-equipped Railway Motors

Not only in all types of electric motors, but in railroad journal service Timken economy and endurance records are phenomenal. Timken results come only from Timken *POSITIVELY ALIGNED ROLLS*. Timken tapered construction and Timken electric steel.

MUCH of the revenue that disappears under the head of "Motor Maintenance" can be saved by means of Timken Tapered Roller Bearings. Their supreme endurance brings the advantages of anti-friction motors to heaviest electric railway service. Only Timken-equipped motors have the extra bearing area and self-contained thrust capacity which best resist the wear from high torque, speed, heavy gear drives and extreme shock conditions.

Timken-mounted armatures are permanently protected from burn-out, for the gap remains constant without frequent inspection and lubrication.

Added to direct Timken savings of labor and material, there is power economy, smoother starting, better acceleration and insurance against delay. From the standpoint of higher net and greater good will Timken motor data commands immediate interest.



DOUBLE ROW SELF-CONTAINED TIMKEN BEARING

SINGLE ROW TIMKEN BEARING

THE TIMKEN ROLLER BEARING CO., CANTON, OHIO





W-N Drive Installation

These New W-N Drive Cars *make hardly any noise*

THAT'S the unanimous verdict of passengers who have ridden them and property owners along the car lines.

They assure a restful trip home for the tired business man—he can read the paper in comfort and talk to friends without shouting.

Working girls and students wait for them and children flock to them just for the pleasure of riding.

The new W-N Drive makes all this possible and even more. Its helical gears, enclosed and running in oil, Timken bearings, low and small unsprung weight and other innovations, give quiet, smooth operation with little side sway and practically no vibration. It approaches the comfort of the luxurious automobile and is superior to the auto bus.

Never before has such a stride been made in electric railway car building or such an impetus been given to old car replacement.

W-N Drive advantages

- Lowest steps
- Faster acceleration
- Quiet operation
- Motors spring borne
- Gears run in oil
- Greater clearance
- Lighter weight
- Lower maintenance

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in All Principal Cities of the United States and Foreign Countries

MEMBER AERA 1928

Westinghouse

X96412

MORRIS BUCK
Managing Editor

JOHN A. MILLER, JR.
Associate Editor

CLARENCE W. SQUIER
Associate Editor

CARL W. STOCKS
Associate Editor

ELECTRIC RAILWAY JOURNAL

CHARLES GORDON, *Editor*

HENRY W. BLAKE
Senior Editor

GEORGE J. MacMURRAY
News Editor

G. W. JAMES, Jr.
Assistant Editor

PAUL WOOTON
Washington Correspondent

ALEX McCALLUM
Editorial Representative
London, England

Vol. 70
No. 26

CONTENTS

Pages
1137-1176

DECEMBER 24, 1927

Editorials 1137

Saving a Small System 1140
By HORATIO BIGELOW.
Complete rehabilitation of cars and track, reorganizing departments and systematizing shop practice have reduced operating costs materially and put the railway on a paying basis.

Statistics on Interstate Electric Railways 1143

Largest Mercury-Arc Rectifier Installation Made at Bridgeport 1144
Connecticut Company has replaced old generating station by two new substations. Energy is now purchased. Operating cost has been reduced more than 25 per cent.

Aluminum Car Tested in St. Louis 1148
Large front-entrance, center-exit, single-end car, designed for light weight and quiet operation in congested city service, is mounted on worm-drive trucks.

Answering Questions Before They Are Asked 1150
By HENRY W. BLAKE.
European electric railway and bus companies have developed a very effective method of signing their stopping points as well as their cars and buses.

Automatic Crossing Gate Developed by North Shore Line 1156

Twenty-one Waiting Stations for Passengers in St. Louis 1157

Maintenance Methods and Devices 1158

Truck for Welding Outfit 1158

Cleaning Systematized at Los Angeles 1158

Setting Poles Under Heavy Traffic Conditions 1158
By R. M. COBB.

Proper Method of Packing Bearings 1159
By JESSE M. ZIMMERMAN.

New Equipment Available 1159

Motor Resistor Heater 1159

Machines for Undercutting Commutator Segments 1160

Portable Grinder and Buffer 1160

American Association News 1161

1928 Convention Goes to Cleveland 1161

News of Other Associations 1162

News of the Industry 1163

Recent Bus Developments 1169

Financial and Corporate 1170

Personal Mention 1173

Manufactures and the Markets 1175

Checking Up

On Ourselves

WE ALL know the story of the darky boy who went to the drug store telephone and called Mrs. Jones. The near end of the conversation, somewhat as follows, was overheard:

"Is this Mrs. Jones?" . . .

"Doesn't you-all want a boy?" . . .

"An' you wouldn't want another boy nohow?" . . .

"All right. Goo' bye."

When he rang off the druggist asked rather sympathetically, "Sam, didn't you get the job?"

"No, boss," Sam replied. "I didn't want no job. I works for Mrs. Jones. I was jus' a-checkin' up on myself."

JUST now the JOURNAL is again helping the industry to check up on itself. Questionnaires that have been sent out and which are being compiled are bringing in statistics showing the progress of the industry during the past twelve months. The completed record will be published in the Annual Statistical Number, dated Jan. 14. Don't miss it. It will give a complete picture of the industry's progress during the year and will contain in addition a forecast for 1928.

Any intelligent checking-up process must be based on facts. That is the purpose of the Annual Statistical Number—to give the industry the facts regarding the past year and what lies ahead.

McGRAW-HILL PUBLISHING COMPANY, INC.
Tenth Avenue at 36th Street, New York, N. Y.
New York District Office, 285 Madison Ave.

JAMES H. McGRAW, President
JAMES H. McGRAW, JR., V.-P. and Treas.
MALCOLM MUIR, Vice-President
EDWARD J. MEHREN, Vice-President
MASON BRITTON, Vice-President
EDGAR KOBAK, Vice-President
C. H. THOMPSON, Secretary

WASHINGTON:
National Press Building
CHICAGO:
7 S. Dearborn Street
PHILADELPHIA:
1600 Arch St.
CLEVELAND:
Guardian Building
ST. LOUIS:
Bell Telephone Building
SAN FRANCISCO:
883 Mission Street
LONDON:
6 Bouverie Street, London, E. C. 4
Member Associated Business Papers, Inc.
Member Audit Bureau of Circulations

Cable Address: "Machinist, N. Y."

Publishers of
Engineering News-Record
American Machinist
Power
Chemical and Metallurgical Engineering
Coal Age
Engineering and Mining Journal
Ingeniería Internacional
Bus Transportation
Electric Railway Journal
Electrical World
Industrial Engineering
Electrical Merchandising
Radio Retailing
Construction Methods
Electrical West
(Published in San Francisco)
American Machinist—European Edition
(Published in London)

The annual subscription rate is $4 to the United States, Canada, Mexico, Alaska, Hawaii, Philippines, Porto Rico, Canal Zone, Honduras, Cuba, Nicaragua, Peru, Colombia, Bolivia, Dominican Republic, Panama, El Salvador, Argentina, Brazil, Spain, Uruguay, Costa Rica, Ecuador, Guatemala, Chile and Paraguay. Extra foreign postage to other countries $3 (total $7 or 29 shillings). Subscriptions may be sent to the New York office or to the London office. Single copies, postage prepaid to any part of the world, 20 cents.

Change of Address—When change of address is ordered the new and the old address must be given, notice to be received at least ten days before the change takes place.
Copyright, 1927, by McGraw-Hill Publishing Company, Inc.
Published weekly. Entered as second-class matter, June 23, 1908, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Printed in U. S. A.

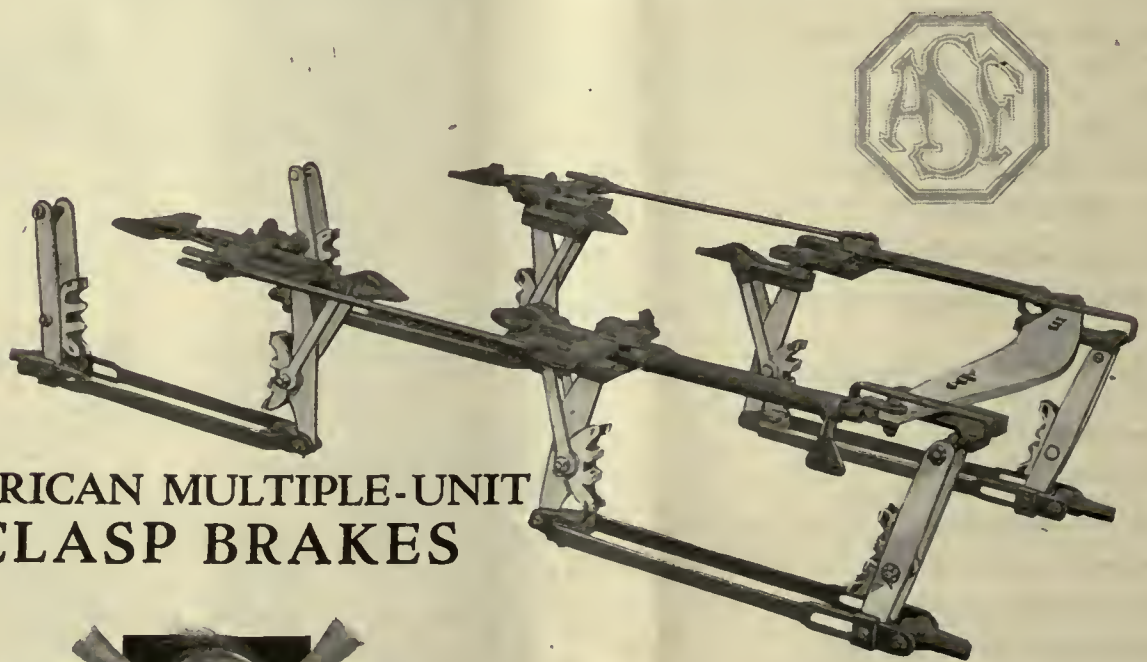
AS LOGICAL AS THE BALANCING OF SCALES



To obtain the unknown weight of an object, by balancing it with known weights was one of the earliest scientific developments. This principle of equalization of forces has had countless practical applications. It is logical.

In the modern railway clasp brake, equal pressure is applied to opposite sides of each wheel, through standard brake shoes, whereas the ordinary practice is to apply the force to one side only. The clasp brake, or balanced braking system, neutralizes the tendency to one-sided wear on journal bearings, pedestals and other truck parts. It affords smoother braking with less heating of brake shoes, and reduces the number of "slid-flat" wheels.

In short—it is the modern and scientific braking system—which is finding increasing favor for heavy traction, and rapid transit service.



AMERICAN MULTIPLE-UNIT
CLASP BRAKES



AMERICAN STEEL FOUNDRIES

NEW YORK CHICAGO ST. LOUIS

DOLLARS AND SENSE!

The old saw—"a penny saved is a penny earned"—is only part of the story. A saving of 1% in electric railway operating expenses accounts for nearly 20% gain in net earnings. And it s surprising how much the many small savings made with O-B Trolley Armor amount to at the end of the year.



Cross Section View of O-B Trolley Armor

Hundreds of Feet of Trolley Wire Need Armorized Protection

GOOD socks are reinforced at points of greatest wear because people *demand* this special protection. Yet on many electric railway properties there are hundreds of feet of trolley wire that need protection but *don't* get it.

Surely, if a pair of socks, inexpensive at best, is worthy of such protection, how much more worth while, from a dollars and sense standpoint, to protect your costly trolley wire! The investment is far greater. And even aside from the saving of wire, which O-B Trolley Armor makes possible, the prevention of trolley breaks is alone important enough to justify this special protection.

It pays to use O-B Trolley Armor at approaches to frogs, cross overs, section insulators, and on curves and at other heavy wear points. The Armor peens around the wire with the opening on top. It protects both the bottom and sides of the wire. Its use prevents rapid wear, frequent breaks, and interruptions to service where wear is heaviest. At the same time, it postpones renewals until the maximum service life has been obtained from every inch of the trolley wire.

See your O-B Salesman for complete details, or write today to

Ohio Brass Company, Mansfield, Ohio
Dominion Insulator & Mfg. Co., Limited
Niagara Falls, Canada
7758

Ohio Brass Co.

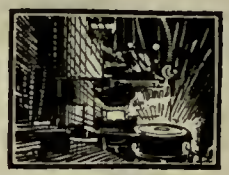
SALES OFFICES: NEW YORK CHICAGO PHILADELPHIA PITTSBURGH CLEVELAND SAN FRANCISCO LOS ANGELES

PORCELAIN INSULATORS
LINE MATERIALS
RAIL BONDS
CAR EQUIPMENT
MINING MATERIALS
VALVES

Gary wrought steel wheels combine the benefits of



rolling with the advantages of forging



Mileage is rolled into them and trouble forged out

for uninterrupted economical and trouble free service

Specify Gary wrought steel wheels

Illinois Steel Company

General Offices: 208 South La Salle Street ··· Chicago, Illinois





In the "Good Old Days"

and To-day:

THOUGH transportation requirements have changed considerably since the "good old days" there's never been a change in our hearty "Merry Christmas"—which we extend each year to our host of friends in the industry.

ELECTRIC SERVICE SUPPLIES CO.

MANUFACTURER OF RAILWAY, POWER AND INDUSTRIAL ELECTRICAL MATERIAL





WASHINGTON RAPID TRANSIT COMPANY
4615 FOURTEENTH STREET NORTHWEST
WASHINGTON, D. C.

E. D. MERRILL
PRESIDENT AND GENERAL MANAGER
ALEXANDER SHAPIRO
ASSISTANT GENERAL MANAGER
C. R. THOMPSON
SECRETARY
L. C. BEALL
TREASURER

November 5, 1927.

The Fisk Tire Company, Inc.,
1901 - 14th Street, N. W.,
Washington, D. C.

Gentlemen:

From the viewpoint of the Superintendent of Equipment of this Company, we are greatly pleased with both tire mileage and service to date on Fisk tires.

We have juet put on thirty-one six cylinder Yellow Coaches, 28 of which are equipped with 38x7 Fisk and 3 with 34x7.5 Fisk tires.

Trouble calls resulting from tire trouble have been kept at a minimum number.

Yours sincerely,

C. S. Putnam

Superintendent of Garage

FISK TIRES



THE FISK TIRE COMPANY, INC., Chicopee Falls, Mass.



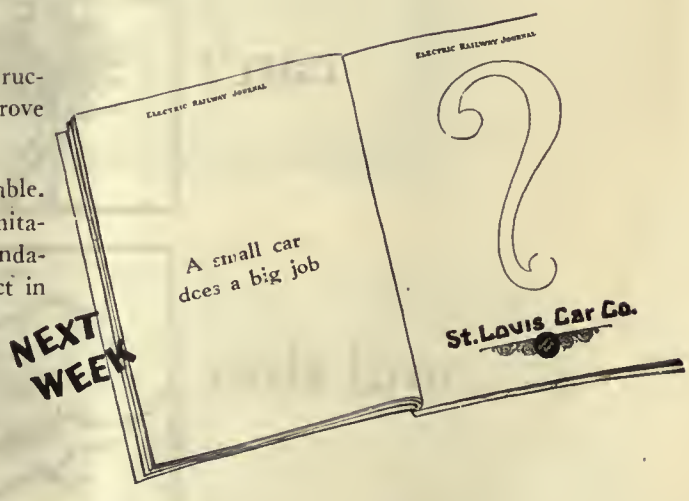
Last week

An obligation fulfilled

This week

The public is as prone as ever to suggest ideas—constructive and otherwise—on what you should do to improve your transportation service.

Most suggestions of this kind, however, are impracticable. They are made with little knowledge of operating limitations. Nevertheless, deep underneath there is a fundamental change in what the public has come to expect in transportation. The Quality Shops is endeavoring to do its part in analysing the extent and character of this changed public taste and of interpreting it in the design of street cars that will build revenues through increased rider sales.



St.Louis Car Co.

Quality Cars

the Owners

of 125,000 buses and trucks on Budd-Michelin Dual Wheels are *averaging* from 15,000 to 20,000 miles and better to the set of tires . . WHY? . . *Because* . .

Budd Duals



can't wobble

can't



shimmy

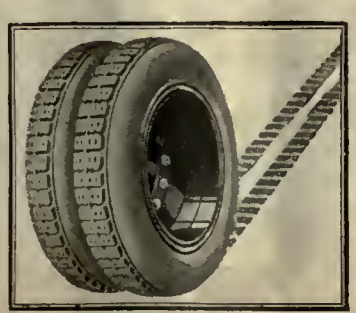
and they



stop sidesway!

Budd Duals always run as true as an arrow—they *can't* get out of alignment—

No loose rim clamps.



So a tire *can't* be put on crooked—

This positive, *permanent* alignment is made possible by Budd Dual design.

BUDD *Wheel Company, Detroit*

STYLES IN TRACK CONSTRUCTION

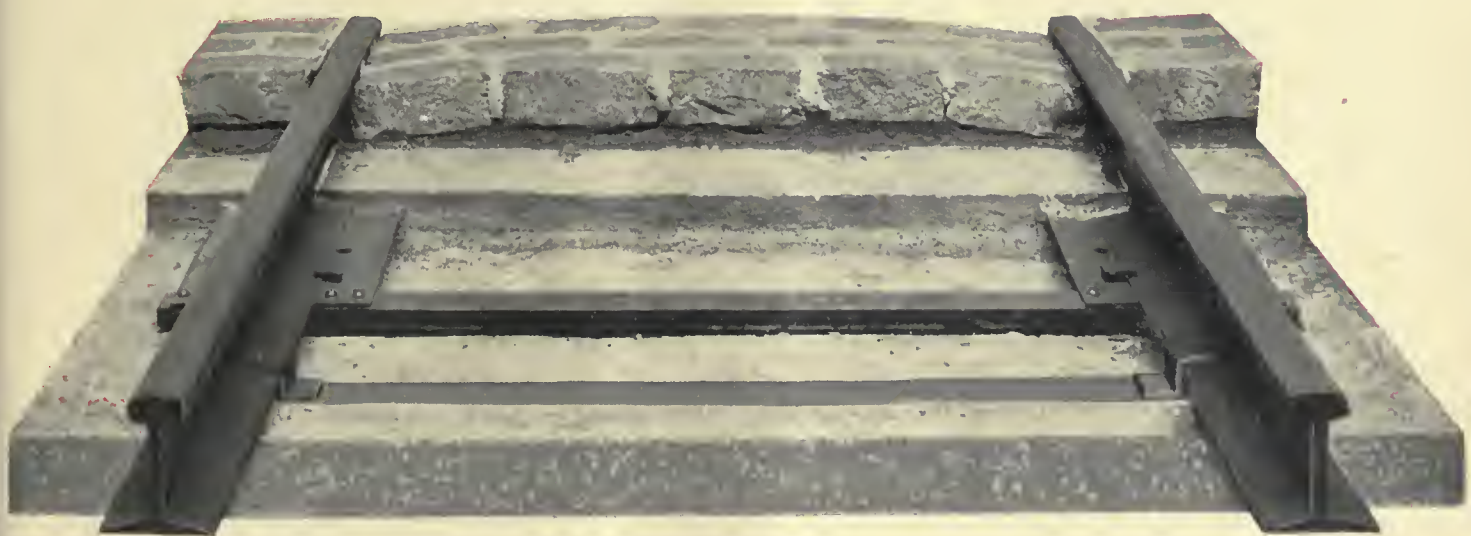
2

This is No. 2 of a series on paved track design with STEEL TWIN TIES as used in over 45% of the cities of over 200,000 population in the United States. No. 3 will appear in an early issue.



YESTERDAY

No. 1 Cincinnati
No. 2 Boston
No. 3 Detroit
No. 4 Philadelphia
No. 5 Kansas City
No. 6 Cleveland
No. 7 Washington
No. 8 Buffalo



STEEL TWIN TIE TRACK

THE BASE OF MODERNIZATION

In Boston



TYPE No. 2 STEEL TWIN TIES are used in Boston for renewal construction on old concrete base. They are furnished punched for rail section No. 102-516. Type No. 2 Twin Ties require only 1¾ inches of clearance, making them readily adaptable to renewal work on old concrete base. With this construction the rails are Thermit welded and the track is paved with granite block.

Complete details and specifications of Boston's renewal method, giving details of the method of anchorage to the old base will be sent on request.

Engineers of The International Steel Tie Company have played no small part in the design of better, more lasting track. We have in our files a fund of data on paved track construction that is at your disposal. We will be pleased to discuss with you your paved track problems, and to help you start your modernization program right. Steel Twin Ties are the first step toward better service, and lower initial and maintenance costs.

The International Steel Tie Co.
Cleveland, Ohio

TWIN TIES ARE ALL STEEL

Wishing you a

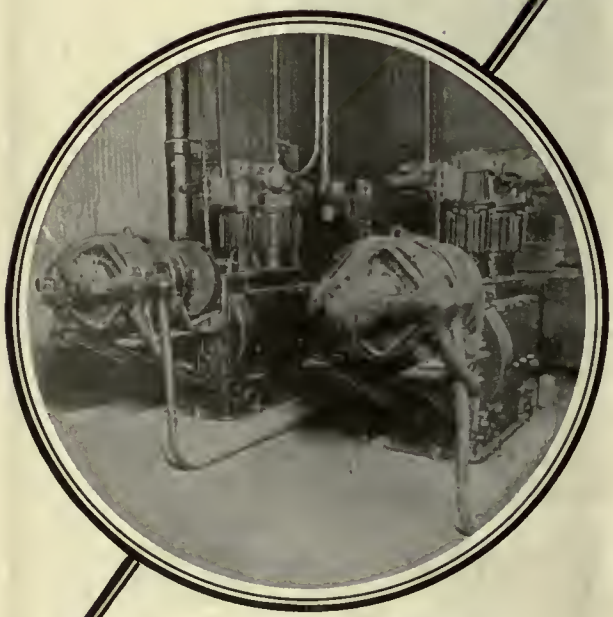
Merry Christmas



and a HAPPY · NEW · YEAR

NATIONAL PNEUMATIC COMPANY





A typical installation of Westinghouse National Compressors, type 2VC, in railway repair shop service.

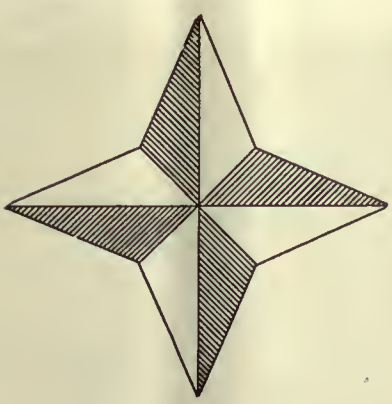
WESTINGHOUSE National Compressors embody the same careful design and precision in manufacture that has typified Westinghouse products for the past half century. These compressors are compact, self-contained, uniquely durable, absolutely reliable in action, simple in operation, and, due to their positive control feature, assure minimum power consumption.

Built in capacity sizes, ranging from 3 to 700 cu.ft. displacement, there is a Westinghouse National Compressor particularly suited to every pneumatic requirement, in the railway shop, power house, and maintenance department.

Westinghouse Traction Brake Company
General Offices and Works: Wilmerding, Pa.

9014

WESTINGHOUSE—NATIONAL
Air Compressors



Low schedules safely boosted

At the Convention a good deal was said concerning the problem of increasing schedule speeds.

We believe that the solution lies as much in more efficient deceleration as it does in better acceleration. Modern motors in lightweight cars take care of the latter very well. And, on two famous properties, efficient deceleration with the Cincinnati Duplex Air and Magnetic Brake has already made fast schedules a fact, both in city and interurban operation, with greatly reduced accident figures.

Let us send you full details and technical data. The cost,—both for installation and maintenance of the Cincinnati Duplex Air and Magnetic Brake,—is surprisingly low.

Cincinnati Car Company, Cincinnati, Ohio

CINCINNATI

BALANCED LIGHTWEIGHT CARS





Goodyear Bus Tires are standard equipment on Pittsburgh Motor Coach Company vehicles

GOODYEAR

Copyright 1927, by The Goodyear Tire & Rubber Co., Inc.

A Safer, Surer Grip on Hills and Turns

Winter weather — slippery going on hills and curves and streets—*now*, more than ever, your buses need the gripping power and the skid resistance of the Goodyear All-Weather Tread.

The All-Weather Tread on Goodyear Bus Tires is the most famous non-skid traction tread in the world.

This is a strong claim, but it is based on the fact that the public has bought millions more Goodyear All-Weather Tread Tires than any other kind.

* * *

The sharp, diamond-shaped blocks of this famous tread not only seize and hold the road but on wet streets and roads the sharp edges cut away the slippery film and give the blocks a chance to grip the cleaned surface.

The result is safer, surer, smoother operation—schedule maintenance and public safety.

* * *

Combined with the gripping power of the All-Weather Tread are those qualities of elasticity and long wear supplied to Goodyear Tires by SUPERTWIST.

SUPERTWIST is the patented cord fabric invented and developed by Goodyear to overcome carcass failures and diminish tire changes. It is the maximum tire assurance of uninterrupted service.

* * *

Because they provide the utmost in gripping power and skid resistance with long, economical life, Goodyear Tires are the exclusive equipment on the vehicles of the Pittsburgh Motor Coach Company, Pittsburgh, Pennsylvania.

"The operation of deluxe motor coach service in Pittsburgh, catering to the high-class residential sections, demands tire equipment which will prove as near 100% as is possible, in order to insure regular, dependable and comfortable service," writes General Manager T. W. Noonan.

"Traffic conditions are severe, grades are many, and the nature of the roads requires the best. Seventy per cent of our fleet is now operating on Goodyear All-Weather Tread Balloon Tires, and the remainder on Goodyear All-Weather Tread high-pressure tires. They have met our expectations in low mileage costs and freedom from failures."

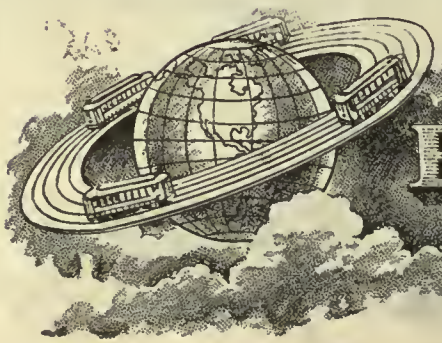
Give your buses the advantages of this safer, surer tire performance which is associated everywhere with "The Greatest Name in Rubber."

For every Goodyear Cord Bus Tire there is an equally fine Goodyear Tube, built especially to the needs of bus service

BUS TIRES

Made with SUPERTWIST

JUST as the electric railway companies have to compile and be guided by exhaustive statistics as to peak loads, traffic densities, costs per mile, and so forth, we must constantly keep ourselves informed as to purchasing power, density of population and all vital market information in order to maintain our service as an active asset of your service.



Barron G. Collier
INCORPORATED
CANDLER BLDG. NEW YORK

101 YEARS OF MANUFACTURING EXPERIENCE

Snow sweeper rattan and cane webbing may be ordered through any H-W sales office.



No. 327-M

FOR INTERURBAN NEEDS

THIS Heywood-Wakefield seat is designed for the modern type of interurban service where comfort is now so important. It has been selected for both new cars and for replacement use.

It has deep, double spring cushions shaped to allow more leg freedom. Mechanism rails are set in. The individual backs are properly pitched for comfort.

Our car seating experts will be glad to help you decide on the best seating equipment for your needs. This service is free through any H-W sales office.



If you have not received a copy of our new Bus Seat Catalogue, write for it.

Heywood-Wakefield
REG. U.S. PAT. OFF.



Heywood-Wakefield Co., Wakefield, Mass.; 516 West 34th St., New York, N. Y.; 439 Railway Exchange Bldg., Chicago, Ill. H. G. Cook, Hobart Bldg., San Francisco, Cal. The G. F. Cotter Supply Co., Houston, Texas. F. N. Grigg, 630 Louisiana Ave., Washington, D. C. The Railway & Power Engineering Corp., 133 Eastern Ave., Toronto; Montreal; Winnipeg, Canada.



They save feeder copper



G-E Automatic Sectionalizing Switch

Birmingham Electric Co.
Boston Elevated Railway Co.
Butte Electric Railway Co.
British Columbia Elec. Ry. Co., Ltd.
Calgary Municipal Railway
Cedar Rapids & Marion City Railway Co.
Cleveland Railway Co.,
Conestoga Traction Co.
Dallas Railway Co.
Denver Tramway Co.
East St. Louis Railway Co.
El Paso Electric Railway Co.
Empresas Electricas Asociadas
Fresno Traction Co.
International Railway Co.
Kansas City Railways Co.
Key System Transit Co.
Knoxville Power & Light Co.
Lake Shore Electric Railway Co.
Los Angeles Railway Corp.
Lynchburg Traction & Light Co.
Market Street Railway Co.
Municipal Railway of San Francisco, Cal.
Newport News & Hampton Ry., Gas & Elec. Co.
New York State Railways
Niagara, St. Catharines & Toronto Ry. Co.
Northern Obio Traction & Light Co.
Northern Texas Traction Co.
Omaha & Council Bluffs St. Ry. Co.
Pacific Electric Railway Co.
Pacific Gas & Electric Co.
Philadelphia Rapid Transit Co.
Pittsburgh Railways Co.
Puget Sound Power & Light Co.
Rio De Janeiro Tramway Lt. & Pwr. Co.
Roanoke Railway & Electric Co.
San Diego Electric Railway Co.
Southern Colorado Power Co.
Texas Electric Railway
Tri-City Railway Co. of Iowa
United Railways & Electric Co.
United Traction Co.
Virginia Railway & Power Co.
Wheeling Public Service Co.
Winnipeg Electric Co.

ALL THESE properties and more are using G-E Automatic Sectionalizing Switches as a means of saving feeder copper and improving feeder distribution.

These switches equalize voltage conditions and provide for the entire system the maximum usefulness of the feeder-copper capacity. In addition they act as automatic breakers to cut out any section where there is a "short" or dangerous overload, re-establishing connections immediately upon the return of normal conditions.

Only by the use of up-to-date equipment that cuts down costs can electric railways earn a fair return in these trying times. G-E Automatic Sectionalizing Switches have proved a real help in lowering costs on scores of properties.



For
Modern Equipment Standards

370-3

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN PRINCIPAL CITIES

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review
Published by McGraw-Hill Publishing Company, Inc.
CHARLES GORDON, *Editor*

Volume 70 New York, Saturday, December 24, 1927 *Number 26*

1928 Convention Goes to Cleveland

ACTION of the policy committee in again selecting Cleveland as the location for the American Electric Railway Association convention, which will be held next fall during the week of Sept. 22-28, may at first be received with some surprise by those who have looked forward to the attractions of Atlantic City as a convention location. Executives who sense the industry's needs will after mature deliberation see the problem of convention location in proper perspective. This should quickly bring widespread approval of the policy committee's judgment and of its courage in acting for what it considered the industry's best interests despite the general popularity of Atlantic City.

There are some, of course, who look upon a convention primarily as an outing; as merely an opportunity to get away from the routine of transportation duties. To them the attractions of Atlantic City are particularly appealing. This is not to say that the social side of a convention, the opportunity for renewing acquaintances and for good fellowship, is not an important phase of an industry's annual meeting. But it is not the most important phase. The serious business of the industry, the study of progress made by other properties, the inspection of developments in equipment and apparatus, the comparison of one's own operating experience with that of others and the acquisition of new ideas should take precedence over all other considerations.

This was the view which dictated the committee's final selection. It was taken only after a careful survey of the industry. The preferences of a large number of railway men from various parts of the country were sounded in advance, and although there existed a considerable sentiment in favor of Atlantic City, it must be remembered that this was expressed without a full knowledge of the situation faced by the several committees which have been studying the matter of location of the 1928 convention.

There was a grave question as to whether the new hall in Atlantic City would be completed in time. A convention in Atlantic City without the completion of this new hall would have been disastrous from the standpoint of continuing the progress made at the last Cleveland meeting. In view of this question about the availability of adequate facilities in Atlantic City, the committee acted wisely in not jeopardizing the success of the convention and the continued progress of the industry by committing the association to the Atlantic City location.

At this critical period in the industry's history an adequate exhibit of cars and car equipment is of paramount importance. At the last convention more progress in this direction was evidenced than at any former similar meeting. As a result, many properties are now seriously studying the possibilities for improving cars to meet present-day transportation standards and traffic conditions. A large number of experimental designs are in progress or are contemplated. This development work is costly both to manufacturers and operators. It seemed therefore extremely important that adequate facilities be provided to give the industry the opportunity of capitalizing to the maximum on this forward-looking work. It is significant that of the manufacturers who expressed themselves regarding this year's convention location, those representing the largest proportion of the total space occupied, were in favor of Cleveland.

Additions to the Cleveland Public Auditorium, which were in progress last October, will be completed shortly and will be available for improved meeting rooms and even better exhibit facilities than those available last fall. The committee's decision represents the mature judgment of men who had the industry's best interests at heart and who reached a conclusion only after the most careful study of all of the factors involved. Their action, therefore, deserves the active indorsement and support of every executive who senses the industry's need at this time.

Echoing the Christmas Message

NO MATTER what our individual conception of the symbolism of Christmas, its message of "Peace on Earth, Good Will Toward Men" strikes a responsive chord in the heart of every man, regardless of creed. It is that chord, attuned to the reception of a sentiment higher than self-preservation and material progress, that constantly throughout the ages has urged man toward higher things.

Surely the message from the humble man of Nazareth has a place in industry. When recognized, it transforms a workaday world with inspiration and romance. Back of the machine that multiplies the work of human hands a thousandfold shines the inspired soul of its designer. Back of the corporation that unites the forces of production and distribution into an intricate and marvelous organization is the heart and brain of a man who has sacrificed leisure and peace of mind on the altar of service and progress.

In the ranks of the transportation industry the message of peace, service and good will has a particularly deep significance. Here romance throbs for every worker whose heart is in the job and who lifts his eyes above the daily task to see the ideals of the organization of which he is a part. On one man's alert watchfulness and devotion to duty sometimes depend the safety and comfort of thousands who intrust themselves and those they love to their public transportation company. On the tap of a hammer, the throwing of a switch, the twist of the wrench of a pipeworker or the bar of the trackman may depend the lives of men, women and children.

Watch a line gang at work in howling storm and darkness! Watch the snow crews on sweeper and plow through the long hours of a driving blizzard! Watch a motorman operate his car safely through the maze of

modern city traffic, or the conductor leave his post to extend a helping hand to aged or infirm. Here, indeed, is good will toward men!

Despite many hardships, unfair treatment and public misunderstanding, the local transportation industry bends with renewed energy to its duty of transporting daily the thousands who must be carried between their homes and offices or factories. Back of it all is the spirit of public service. In the performance of the men who devote their lives to this task, from president to the humblest trackworker, there is opportunity daily throughout the year to reflect the message that Christmas brings.

Signs and Countersigns

EUROPEAN practice in the methods of marking cars and car stops is far in advance of that in America. Here the companies which go farthest in indicating the stopping points of their cars carry a lettered enameled sign on the span wire or suspended from a bracket on a trolley pole, the sign reading "Cars stop here," or having words of similar meaning. A less effective, although more common, method is to paint on the span wire pole a white band, which may indicate a car stop to some people, but nothing to others. Still other companies do not mark their stops at all, though their cars sometimes stop to receive and discharge passengers at the near corner and sometimes at the far corner.

European practice begins where American practice ends. The companies in Europe which pay the least attention to marking stop points use the lettered signs. Most companies add to this sign the numbers of the car routes which pass that point. Many augment this information by giving also the terminals of these routes. Some include a time-table. In a number of cities the stop signs are arranged so that they are illuminated at night.

European roads lead most of those in America also in the matter of signing their cars and giving the public information about routes and schedules. They indicate the routes not only on the front of the car but at the sides, in wording which can be read a considerable distance away, and they illuminate these signs so that they can be seen at night. An account of European practice in all of these particulars is given in an article elsewhere in this issue entitled "Answering Questions Before They Are Asked."

Much thought has been given in this country to the merchandising of transportation, but advertising the serice is only part of the task of attracting and retaining patronage. Railway companies should make it easy for the passenger to find the car he wants to use and be sure that it is going where he wants to go. Otherwise, their attitude would be like that of a merchant who urges customers to come to his store, but does not tell them where it is, and when they get there, largely by chance, he refuses to inform them where he keeps the goods they want to buy.

The importance which the London Underground Combine attaches to the subject of proper station, car and bus signs is shown by its employment of one official who does nothing but determine what improvements can be made in these signs, i.e., in their design, location and wording. Here is a suggestion from England worthy of adoption here, Mayor Thompson of Chicago to the contrary notwithstanding. He thinks that English ideas should be kept out of this country, but this one might be smuggled in to the advantage of all concerned, and there are other European ideas just as good from which our railways can profit.

It is strange that so many railway companies in America should not have done more in this respect. In other lines of business signs are used extensively. One cannot take an automobile tour, even in the most unsettled parts of the country, without being told at almost every turn about the merits of various tires, hotels and department stores. Some of these display signs, especially in scenic resorts, are so obtrusive as to violate good taste. At every crossroad, also, he will find direction signs put up by automobile clubs, the state authorities or the federal government. But in street railway practice it almost appears that an intending passenger must exercise second sight or exchange signals with the motorman of an approaching car before being sure where it will stop or if it is the one he wishes to board.

It seems at times as if some companies took for their motto the verse from Scripture: "A wicked and adulterous generation seeketh after a sign; and there shall no sign be given to it." If so, they should read further in the same authority and they will learn that signs come from heaven to aid the helpless, weak and ignorant. If more transportation managers would put themselves in the position of car riders, they would soon realize the questions which intending passengers are forced to ask of passers-by because they cannot learn what they want to know from the company itself. These questions should be answered before the passenger asks them, or he will be tempted to use a taxicab or walk.

Concerted Effort Needed for Traffic Relief

CONGESTION of traffic in most large cities continues to grow unchecked. Sporadic attempts to bring some measure of relief by cut-and-try and hit-or-miss methods prove ineffective or are quickly outgrown. Figuratively speaking this tangle and snarl of interfering traffic makes of our city streets a modern Babel which threatens to defeat man's ambition by self-created confusion and lost motion.

It seems to be generally accepted that the situation is growing progressively worse. Among those directly engaged in the effort to bring about relief there is also the conviction that overlapping and duplication of the several bureaus, commissions and private agencies which exist in some communities, and which are invested with varying degrees of power, result in conflicting effort, wasted energy and, in some instances, serious waste of public funds.

Frequently the board of aldermen or the city council employs a traffic engineer working directly under that body's authority and direction. There also may be a city planning commission created by ordinance and invested with broad powers. Such a body is inevitably engaged in preparing plans and in making recommendations that vitally affect both present and future traffic conditions. One finds also, in several cities, a rapid transit commission, whose studies and recommendations are inextricably tied up with the work of the preceding groups. There may be in this same city a transportation commissioner or supervisor who regulates the operation of public transportation agencies, the movement of whose vehicles is a part of the general traffic problem. There may be, also, a traffic division of the police department. In several instances such a department, finding itself

unable to enforce the traffic regulations recommended by others, undertakes itself to study the problem and to make recommendations for bringing about relief.

So much for government bureaus and departments. Next come the efforts by more or less public-spirited citizens and organizations to aid in bringing about relief. The merchants' association decides to do something about traffic congestion, and if it is aggressive it may hire an engineer to study the situation and make recommendations for improvement of conditions. The automobile club has an interest in the subject and it also starts out to suggest measures for relief, and sometimes carries this on to an active campaign in support of its ideas. And so on *ad infinitum*. The larger the city and the more complex the problem the more agencies one finds advancing suggestions and insisting on the adoption of pet measures.

It needs but casual consideration of this situation to find a basic reason for the lack of progress toward a satisfactory, community-wide policy and plan for relief. Most measures that are adopted are mere expedients to satisfy the popular clamor for action. Until the many government and private groups find some means of pooling their activities in a central planning, transportation and traffic body, with ample funds and power to proceed effectively toward the development of definite policies and a comprehensive plan, there can be little hope of progress toward substantial and permanent relief from present conditions.

Financing on Favorable Terms by Twin City Company

NO SINGLE piece of financing done by an electric railway this year exceeds in interest the offering just made by the Twin City Rapid Transit Company, Minneapolis, of $18,000,000 first lien and refunding 5½ per cent gold bonds at a price to yield the investor more than 5.70 per cent. In some respects it is a criterion as to what other companies similarly situated may be able to do, but it is not desirable to carry the analogy too far. The company has not been without its problems in the past, serious problems at that, but most of the elements affecting it are favorable to successful results in the future. Operation is under indeterminate permits, valuations have been fixed upon which the company is permitted to earn an adequate return, and railway, bus and taxi operation are co-ordinated in the Twin Cities. Cash dividends have been paid on the common stock since 1899.

The accomplishments of the company are self-evident. Of greater interest just now is the purpose behind the present financing. In some respects the issue is in line with the recommendations of the committee on finance of the American Electric Railway Association. As President Lowry has said, the program now adopted will make possible the refunding of all existing debt as it matures and provide complete separation of the bonded debt of the St. Paul City Railway and the Minneapolis Street Railway, the principal constituents of the Twin City Company. The terms of the indenture securing the bonds are of interest because of the provision for the issue of additional bonds, particularly for refunding of obligations of the St. Paul City Railway maturing in 1932, 1934 and 1937. So far as the present offering of $18,000,000 is concerned, of the proceeds $15,000,000 and interest accrued to dates of maturity will be deposited with the trustee to retire $15,000,000 principal amount of funded debt of the pledging subsidiaries maturing Aug. 15 and Oct. 1 next, and the rest to pay for capital additions and other corporate purposes. In short, the Twin City offering is a large issue placed at favorable terms at a time of easy money that appears to afford the company ample ways in which to meet its future maturities and its capital requirements.

What Is Ahead for the Boston "L"

SIGNS all point to the settlement of the problem of the future of the Boston Elevated Railway at the coming session of the Massachusetts Legislature. Just what will be done, however, remains a mystery. The state body may adopted the Harriman plan, which called for the organization of a new company backed by state credit to carry out a comprehensive metropolitan transit plan. It may adopt the plan of Senator Warren for an extension of the present period of public control and private operation. It may adopt the Eliot Wadsworth demand for a return of the road to private control. If the Legislature does nothing about the matter, and that seems very unlikely, the road would at the end of the period of public control revert to the board of directors, who might continue to operate it on the service-at-cost plan and pay dividends at prescribed rates.

In any event two recent occurrences will tend to shape the future. These are the advisory opinion by the Supreme Court replying to the intricate questions of law raised in the Legislature last April with regard to pending plans for the road's reorganization and the more recent report by the Department of Public Utilities which places the reproduction cost of the Elevated at $188,016,892, the transportation value at $118,837,253 and the book value at $109,103,445. This last report, referred to in the JOURNAL for Dec. 17, is of particular interest. It fixes the option price of about $109,000,000 secured to the Commonwealth by the Act of 1918 under which the road is now run at about $10,000,000 less than the direct going value determined by the Department of Public Utilities and at $20,000,000 less than the conservative net value found by subtracting depreciation from the full reproduction cost. The report by the state commission certainly substantiates the statement, repeatedly made, that the railway represented an honest investment under public supervision that had prevented excessive issues of stock or bonds.

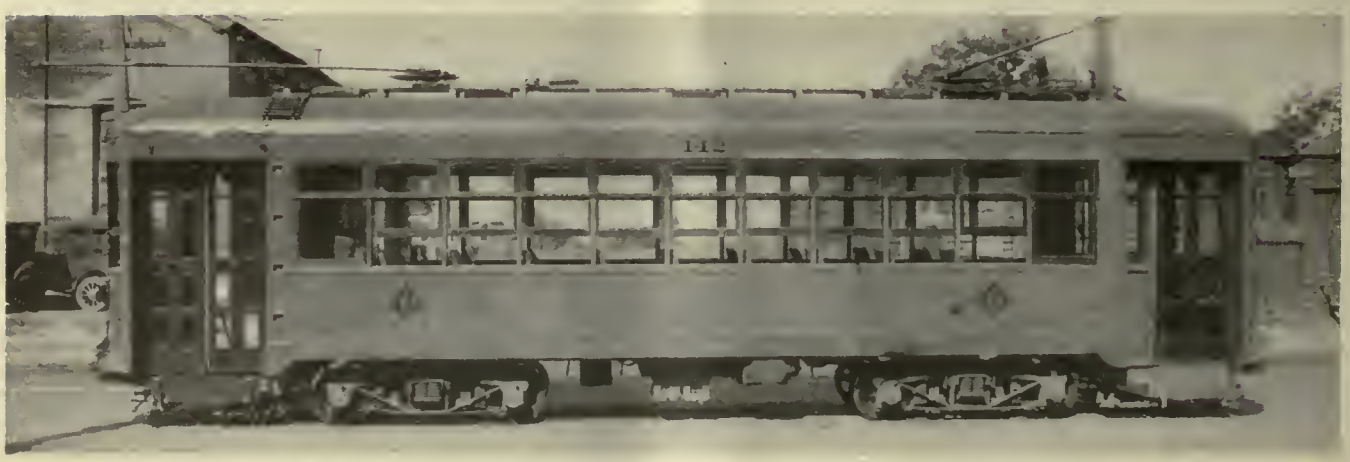
It is impossible to refer here to all the factors in the situation or to consider their intricacies. As indicated previously, the disposition of the matter rests with that unknown quantity the State Legislature. If the Governor has his way there will be no exercise by the state of its right to take over the road. He believes that the situation is one which gives the state a distinct advantage but that the solution of the Elevated problem lies in a continuation of public control without public ownership.

The present plan was adopted almost ten years ago at a time the struggle of the management to provide service for a 5-cent fare had brought about suspension of dividends and depreciation of property. It has worked well. At that time the problem was to secure the continuance of the service in an adequate manner. The public control act achieved that end. There would appear to be no reason why the present plan should not be continued with such changes and modifications in it as the working of the original act has shown would be advantageous.

Saving a Small System

Complete rehabilitation of cars and track, reorganizing departments and systematizing shop practice have reduced operating costs materially and put the railway on a paying basis

By Horatio Bigelow
Superintendent of Railway South Carolina Power Company, Charleston, S. C.



The rebuilt double-truck cars are very attractive and are economical to operate

WHAT can be done to solve the problem of reducing operating costs and putting a comparatively small road on a paying basis is afforded in the experience of the railway system of the South Carolina Power Company at Charleston. A complete rehabilitation program involving the remodeling of many old cars and the purchase of several new, improved, Birney-type safety cars along with reorganizing the personnel, studying traffic problems and accident reduction, selling rides by advertising, effecting economies in several departments and systematizing the entire shop organization and practices made a new road of this street railway.

Co-operation of Men and Management Secured

Not long ago a state of armed neutrality prevailed between the man and the management. As often happens, the trainmen and shed force were continually at odds. Today they are pulling together and men and management are a 100 per cent unit combined to finish the job of saving the railway. Teamwork, without which results could never have been obtained, is now evident in every department. Each man has been sold on the possibilities and responsibilities of his job. Every employee has been brought to realize that advancement or failure depended on his own individual record, and if given sufficient rope the undesirable elements hung themselves.

Close contact with the trainmen was maintained by monthly meetings with their committee and on their invitation by regular talks before the monthly meetings of their local. Frequent talks with the shed force also kept up their interest. At these meetings, employees were posted frankly as to conditions in the railway department, insuring their utmost efforts to maintain their jobs and, incidentally, to help save the situation. Courses in "Public Utility Economics" and "Electric Railway Transportation" besides putting men in line for promotion made them supporters of the management through a better understanding of the business.

Influence of Unified Organization Far-Reaching

The unified railway organization had a far-reaching influence. Average schedule speed of the system was increased 20 per cent, from 7.5 m.p.h. in 1923 to 9 m.p.h. at present, despite an increase of 40 per cent in one-man car operation and a considerable increase in traffic congestion due to the doubling of the number of automobiles during the period. In 1923, 77 per cent of the cars operating were "on time." The last traffic check showed that 95 per cent of the cars operated were on schedule. The trainmen at first viewed the new and faster schedules with consternation and said, "They can't be maintained." It was pointed out that such schedules were being maintained on comparable systems, and that the men's jobs might hinge upon the solution of the problem. The problem was solved.

The management did its share to help the trainmen in their efforts. Careful and constant checking of schedule maintenance by the supervisory force was a big help, as was the elimination of unnecessary stops. A third was the relocation of turnouts. Also, by co-operation with the steam railroads delays at grade crossings were reduced to a minimum.

Five different types of cars were in use in 1923. Most of them were too large, not suited for one-man operation and expensive to operate. By remodeling several of the cars for one-man operation, purchasing new, improved-type Birney safety cars, adding some double-truck cars in good condition and retiring the obsolete



Double-truck cars weighing 23 tons and costing 2.25 cents per car-mile for maintenance were retired from service

cars the company was able to reduce operating and maintenance costs to a minimum. At the same time the service was made more attractive to the patrons. Full details of this car rehabilitation program were contained in an article appearing in the Sept. 17 issue of this paper, page 489.

When the city launched an extensive paving program requiring four years for completion the railway laid plans for reconstructing its tracks. The smooth track made possible the extensive operation of single-truck cars. A program of rerouting to avoid duplication of service was carried out and unnecessary track was abandoned. Single track was substituted on some lines that did not warrant a double track.

Traffic Situation Alleviated

Charleston, with its narrow main thoroughfares, is not free from traffic problems. Through co-operation between the management of the railway and the police department however, the situation has been alleviated considerably. Convictions for parking automobiles improperly were increased 600 per cent. The increase in schedule speeds also bespeaks the work of the two bodies.

Accidents have been reduced 50 per cent during the period under consideration. The campaign to this end was begun with a "Trainmen's Bulletin," setting forth the total cost of claims filed against the railway and showing that immediate action was necessary to remedy the critical condition. This was followed, at the trainmen's invitation, by a series of talks on accident prevention before their local. A graphic "Trainmen's Accident Record" was maintained in the dispatcher's office giving names, badge numbers, dates and classification of accidents. Each trainman who worked twelve months without an accident was given a gold safety button. In training new men, special care was taken to show them the quickest method of making emergency stops.

In any accident where a question arose as to the trainman's liability, he was summoned to the superintendent's office for a review of the circumstances and advised how to prevent a similar accident. In many minor accidents where the trainman was clearly at fault he was required to pay personally for the damage if he desired to retain his position. If a man's accident record showed that he could not, or would not, improve in this respect he was dropped.

Advertising and Selling Rides

In 1923 an advertising campaign set forth the benefits to be gained by patronizing the railway. Figures showing the condition of the system and that the public could buy street car service for $1 which cost $1.25 to produce were effective.

When the railway prepared its program of car and track rehabilitation, a thorough knowledge of the company's predicament was told by its advertisements. Because the city administration knew the facts no opposition to the plan was voiced. Again when the railway company petitioned the city for abatement of paving charges little argument was necessary, for the company's frank publicity already had presented its case.

"Giving the public somewhere to go," was the theme



Removing track on Bay Street, using concrete breakers to remove sections of old pavement



Street and track improvement on Meeting Street, showing the west half completed



Improved Birney-type cars weigh but 6 tons and consume 1.10 kw.-hr. per car-mile, a saving of 0.92 kw.-hr. over the old cars

of a plan to increase riding. For example, for the colored patrons of the system, 50 per cent of the total passengers carried, a small park located on one of the car lines was given nominal financial encouragement and advertised on the cars. Five months operation of this park increased the gross revenue through additional patronage to such an extent that 250 per cent was realized on the investment.

In another attempt to bolster up car riding the inconspicuous standard car color was changed to a bright orange. The first car that came through the paint shop in its changed garb bore slogans to advertise street car riding as the most economical and safe transportation medium. It was run for three days in regular service on each of the city lines. During the first three days operating receipts were 6 per cent higher than those of the other cars on the same line. A favorable editorial carried in one of the local papers regarding this innovation proved the experiment a decided success.



Six street car routes serve the city of Charleston, S. C.

Several minor changes of practice and organization have reduced operating costs a surprising amount. Energy conservation was obtained through further instruction of trainmen in the use of power and handling air brakes. The men's interest was aroused and co-operation obtained by comparative graphic records. As a check on energy consumption enough recording watt-hour meters were provided to equip one car of each type operated and these cars were so rotated in service as to obtain a measure of the same results as if all cars were equipped with meters, with 87½ per cent less cost. The saving effected was over 10 per cent, measured in kilowatt-hours per car-mile.

A more efficient system of fare collection and registration resulted in a smaller loss of gross revenue. The year before the system was installed gross revenue decreased 18 per cent. During the next year nine months' gross decreased 9 per cent and the first full year it was in operation the decrease was 5 per cent. Incidentally, the proportion of total revenue increased 10 per cent.

A "Daily estimate, income from operations" sheet, showing relation of actual revenue to operating expense, based on a closely estimated car-hour cost, served as a check on the profit of the service. Together with frequent traffic checks it made possible the proper co-ordination of schedules with traffic requirements, reducing car-hour wastage to a minimum while fulfilling the demands of the riding public.

Reduction of forms in size and number and combination of some of them has saved money without sacrificing the detailed information required. The purchase of a mimeograph machine aided this work.

The storeroom account had shown little reduction since the war period. A close check of quantities required cut this account 20 per cent, with consequent saving in money tied up in stock and interest thereon.

Careful reorganization of the supervisory force resulted in a 50 per cent reduction of this body, with improved efficiency. Understudies were provided for all positions in preparation for emergencies such as vacations, vacancies, illness, etc.

When shop employees were paid off during working hours, practically every man came back to the receiver's office for change. The loss of time was obvious, so the system was changed. Today the men are paid off at quitting time and a saving of 2 per cent per year has been gained.

Comparison with other systems, as well as an improved account classification, directed attention to possible economies in shop organization. In 1923 the force consisted of more than 60 men. In 1924 it was reduced 39 per cent; in 1925, 8 per cent; and in 1926, 10 per cent, a total over the period of 57 per cent. In 1923 the railway employed one shop man for every 22,000 passenger car-miles operated; now there is one employee for every 47,000 passenger car-miles operated.

Maintenance Costs Cut to Half

Increased efficiency and modernization of shop practices, introduction of forms necessary to provide information placing definite responsibility for car failures and abnormal costs, together with the co-operation of the shed force obtained the result that car mileage per pull-in was increased from 1,200 in 1923 to 6,500 in 1926—more than 400 per cent. During the same period, the maintenance cost per car-mile was decreased from 4.95 cents in 1923 to 2.65 cents in 1926, practically 50 per cent reduction. Some of the practices that were a means to this end are given in brief form.

The adoption of the spray method reduced the labor cost of painting cars 40 per cent. It made possible the completion of necessary work in three-quarters of the



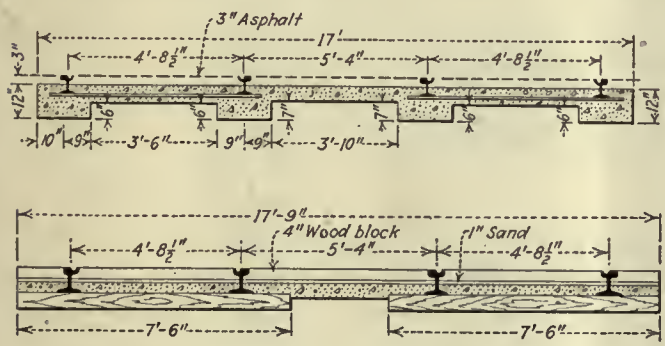
The old single-truck cars weighed 14 tons, consumed 2.02 kw.-hr. per car-mile and had a maintenance cost of 3.15 cents per car-mile

time formerly required, and the painting force was used to advantage on outside work during the time saved, with consequent credit to maintenance of cars.

Waxing cars, instead of washing, has made possible the use of a much cheaper system of painting, and the paint lasts half again as long as resulted from the former more expensive system. It has effected a 25 per cent saving in labor.

Dipping and baking of armatures and fields has increased mileage of armatures from 150,000 to 308,000, more than 100 per cent, and that of fields proportionately. For one type of motor in regular operation, thirteen armatures had to be rewound in 1925. In 1926 this was reduced to two. The dipping and baking outfit was assembled and constructed from scrap material at a cost of less than $30.

Life of armature bearings was far below the average. Purchase of a pyrometer for $50 insured pouring of bearing metal at the proper temperature. The bearings were pressed on under sufficient pressure and care was



Old and new construction for double track. Wood ties are replaced by No. 3 standard steel ties, and asphalt is substituted for wood block

taken to see that the bearings were kept free from dirt and grit. These methods have increased the life of armature bearings 65 per cent.

The actual expenditure for a circuit breaker testing set was $4. It has been helpful in the reduction of maintenance of electrical equipment of cars. Polarity tests for motors have had a similar result, with a saving of time in assembling motors. Radio testing for defects in electrical equipment proved practical, low armatures even being discovered by its use.

The cast-iron wheels used were found to have a sufficiently thick chill to warrant a trial of wheel-truing brakeshoes. The trial was successful and the continuance of this practice increased car wheel life from 18,000 to 60,000 miles, or 300 per cent. Standardization of brake heads made possible the use of a number of brakeshoes that had been classed as obsolete along with the cars for which they were originally purchased. Improved brake rigging, costing $30 for each car, avoided the necessity for the purchase of slack adjusters and reduced "pull-ins" and maintenance costs.

Lubrication costs were reduced 13 per cent through continuous checks and employee instruction in economical methods, and trolley wheel mileage was increased from 4,500 to 8,000 miles through improved lubrication. By using both ends of brushes, the cost per mile of carbon brushes was reduced from 0.034 cent to 0.015 cent.

Statistics on Interstate Electric Railways

OF THE electric railway companies of the country 252 do an interstate business and report operating statistics to the Interstate Commerce Commission. Some of these, like the United Electric Railways of Providence, R. I., are primarily city systems but have interurban extensions. Others, like the Kansas City Public Service Company, report because some of its city lines cross the border line of two adjoining states. But most are primarily interurban lines. Some of the statistics, contained in a report of the Interstate Commerce Commission, Bureau of Statistics, for the year ended Dec. 31, 1926, are given in the accompanying tables.

Ranked in the order of gross operating revenue, the Pacific Electric Railway of Los Angeles, Cal., is by far the largest company reporting, its total operating revenues for the year amounting to $19,111,164. The Hudson & Manhattan Railroad comes next with $8,855,678. The United Electric Railways of Providence, R. I., comes third with $8,193,660. The Chicago, North Shore & Milwaukee comes fourth with $7,730,152. The Kansas City Public Service Company comes fifth with $7,664,599.

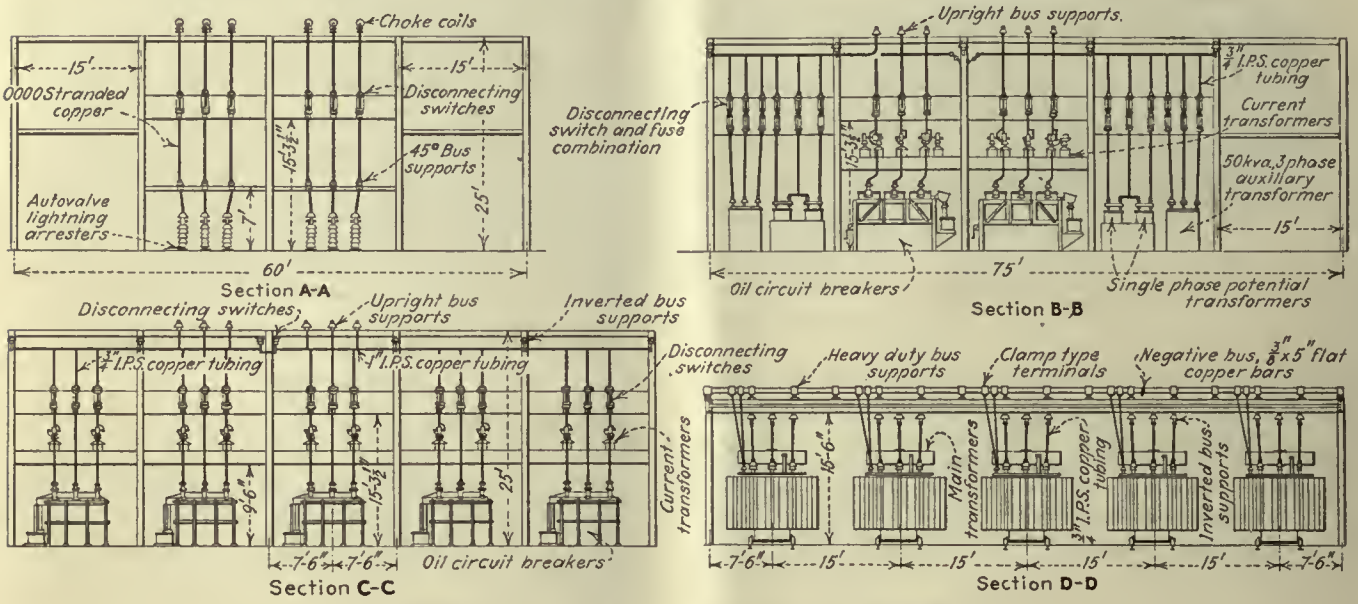
FINANCIAL AND OPERATING DATA FOR CALENDAR YEAR 1926 OF INTERSTATE ELECTRIC RAILWAYS

Item	Total, All Districts	Eastern District	Southern District	Western District
Number of companies reporting	252	167	8	77
Miles of road operated	13,221	7,613	453	5,155
Freight revenue	$39,382,332	$15,531,408	$2,629,703	$21,221,221
Passenger revenue	138,428,701	78,771,689	2,196,964	57,460,048
Total operating revenues	$191,949,159	$102,350,282	$5,197,002	$84,401,875
Total operating expenses	160,702,288	85,228,330	3,931,971	71,541,987
Taxes assignable to railway operations:				
Other than U. S. government taxes	$11,300,002	$6,128,924	$445,081	$4,725,997
U. S. government taxes	997,495	659,496	110,787	227,212
Operating income	36,137,540	24,547,000	1,337,964	10,252,576
Net income	12,216,134	6,512,243	22,224	5,681,667

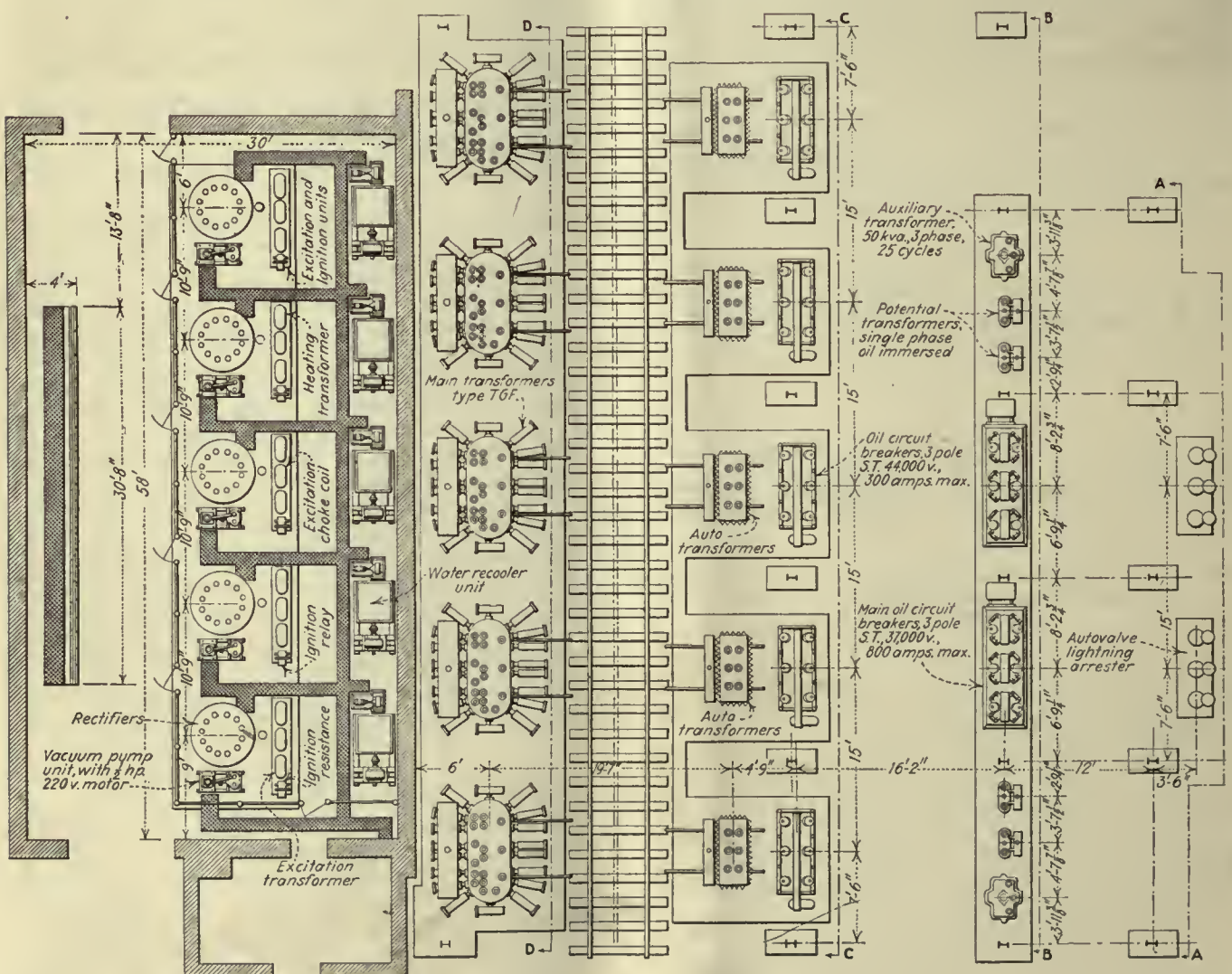
SUMMARY OF SELECTED FINANCIAL AND OPERATING DATA FOR CALENDAR YEAR 1926

Item	Total, All Districts	Eastern District	Southern District	Western District
Rolling stock:				
Buses	998	568	1	429
Passenger-carrying cars	11,843	6,957	272	4,614
Freight cars	16,483	6,024	341	10,118
Other cars	3,279	1,971	76	1,232
Locomotives	586	234	26	326
Mileage, traffic and miscellaneous statistics:				
Passenger car mileage	368,635,296	198,130,555	7,355,580	163,149,161
Freight, mail, and express car mileage	74,844,585	28,265,370	4,244,230	42,334,985
Revenue passengers carried (thousands)	1,343,757	811,079	25,005	507,673
Operating revenues per car-mile (cents)	43.282	45.209	44.802	41.075
Operating expenses per car-mile (cents)	36.237	37.646	33.897	34.816

Layout of Mercury-Arc Rectifier Station at Bridgeport, Conn.



Cross-sections at A-A, B-B, C-C, and D-D of ground plan



Ground plan of new substation



This battery of five 2,000-amp., 600-volt mercury-arc rectifiers is said to be the largest installation of its kind in the world

Largest Mercury-Arc Rectifier Installation Made at Bridgeport

Connecticut Company has replaced old generating station by two new substations. Energy is now purchased. Operating cost has been reduced more than 25 per cent

WHAT is said to be the largest installation of mercury-arc rectifiers in the world has been made by the Connecticut Company at Bridgeport. Two new substations have been designed and built under the supervision of George E. Wood, power engineer, one in the center of the city having five 2,000-amp., 600-volt units and a second in the nearby town of Stratford having two units of the same size. These are among the first substations where the entire load is carried on rectifiers. The pre-eminence in capacity of the Bridgeport substation may be of short duration, however, as an order has already been placed by the Commonwealth Edison Company of Chicago for two 5,000-amp., 600-volt rectifiers and it is possible that the size of this installation may be increased in the near future.

The designs of the new substations are the result of studies commenced early in the fall of 1926 by the Connecticut Company looking to the creation of modern power facilities for its electric railway lines in that district. The company's Seaview Avenue generating station was antiquated and costly to operate. Its location was remote from the load center and considerable loss was occurring in the trunk feeders. Another influential factor was the impending necessity for the company to spend about $60,000 for a new submarine cable crossing at the Yellow Mill River, where the city was planning to relocate an important highway bridge.

Studies made by the company's engineers indicated that the power demands could be met most satisfactorily by the construction of two substations, one in the vicinity





At the left is a back view of rectifiers showing auxiliary apparatus, while at the right are coolers for circulating water, located along back wall. In summer the warm air is released outdoors, while in winter it is used to heat the building

of the Congress Street carhouse in Bridgeport and the other at Stratford. The former, which is manually operated, is designed to carry the bulk of the load, while the latter, which is fully automatic, serves the eastern part of the territory.

Mercury-arc rectifiers were chosen for four reasons: (1) Efficiency; (2) ability to operate on either 25 or 60 cycles; (3) low maintenance cost; (4) freedom from heavy foundation requirements.

For convenience and simplicity it was decided that all units at both substations should be the same size. Accordingly, seven 2,000-amp., 600-volt rectifiers were ordered from the American Brown Boveri Electric Corporation early in the present year. Each unit has a momentary overload capacity of 3,000 amp.

Energy is at present obtained from the generating station of the Connecticut Light & Power Company at Devon, on the Housatonic River, 7 miles east of Bridgeport. It was considered possible that at some future time the Connecticut Company might wish to purchase its energy from the New York, New Haven & Hartford Railroad, which operates on 25 cycles. Thus, the ability of the mercury-arc rectifier to operate at either 25 to 60 cycles is an important advantage it has over the rotary converter for this installation.

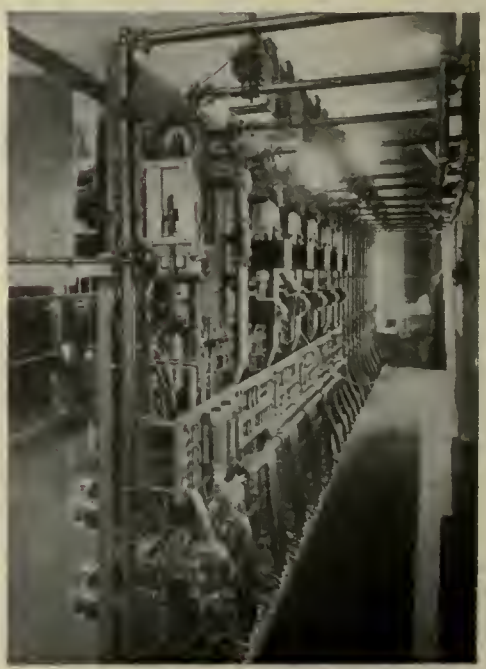
Another important advantage in this instance is that the rectifier does not need foundations as heavy as for a rotary. The new Bridegport substation is on made land between the Congress Street carhouse and the Pequonnock River, and foundations sufficiently heavy for rotary converters would have involved considerable cost.

From the Devon generating plant of the Connecticut Power Company two 13,000-volt, three-phase, 60-cycle transmission lines have been built to the new substations. Both of these are located close to the right-of-way of the New York, New Haven & Hartford Railroad and the transmission lines are carried on the existing overhead bridges of the railroad.

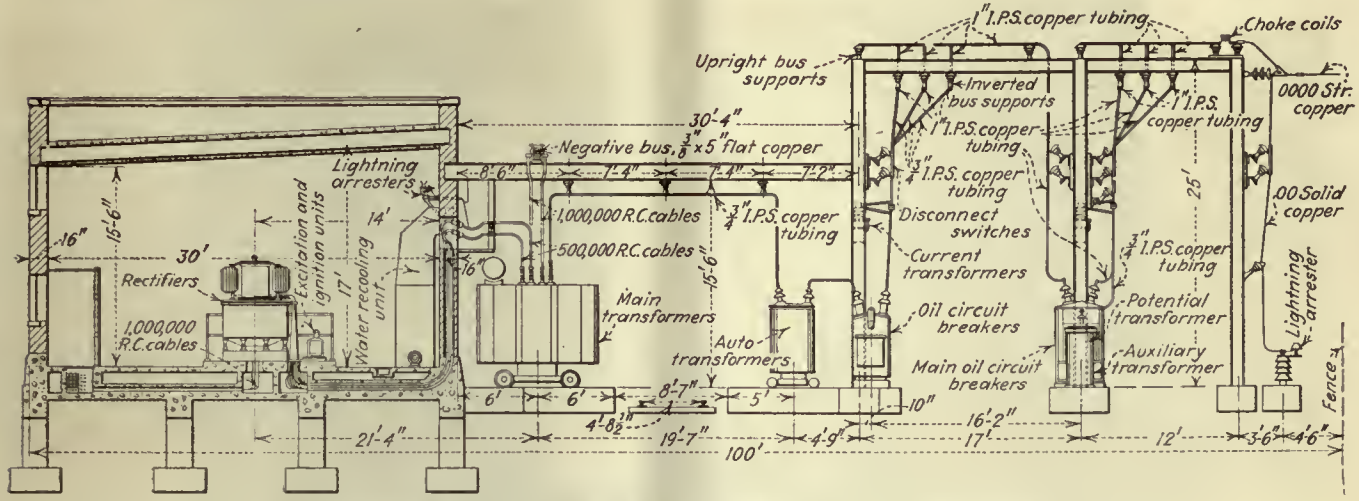
Outdoor equipment at the Bridgeport substation includes auto-transformers, main 1,400-kva. transformers,



Switchboard in new Bridgeport substation has twenty panels, fourteen for feeder lines, five for rectifier control and one for incoming lines and transformers, switches, etc.



Rear of switchboard. Each cable is tagged to prevent confusion on account of the complicated wiring



Side elevation, showing arrangement of apparatus in new Bridgeport substation and outdoor transformers and auxiliary control

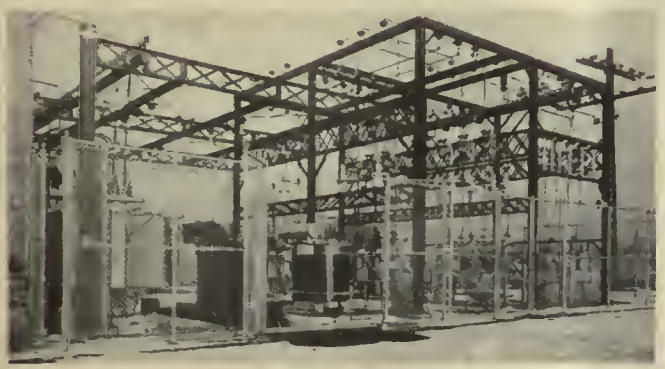
as well as the usual disconnecting switches, oil circuit breakers and other auxiliaries. The auto-transformers are provided with five taps 2 per cent above normal rating and five taps 2 per cent below normal. The reason for the use of these units is to permit operation at 6,600 volts, 11,000 volts or 13,900 volts as desired. It was felt by the designing engineers that it would not have been feasible to design the main transformers to operate satisfactorily at these various voltages.

Inside the substation are the five rectifiers with their circulation pumps and the switchboard. This board has twenty panels. At one end is a panel for the incoming lines and auxiliary control. On this are mounted also the main and auxiliary meters. Next are five rectifier panels, on which are mounted a.c. remote control switches, d.c. circuit breakers, overload, reverse power and thermal relays, as well as switches for the rectifier auxiliaries, d.c. ammeters and vacuum indicators. At the other end are fourteen feeder panels with circuit breakers, switches and ammeters.

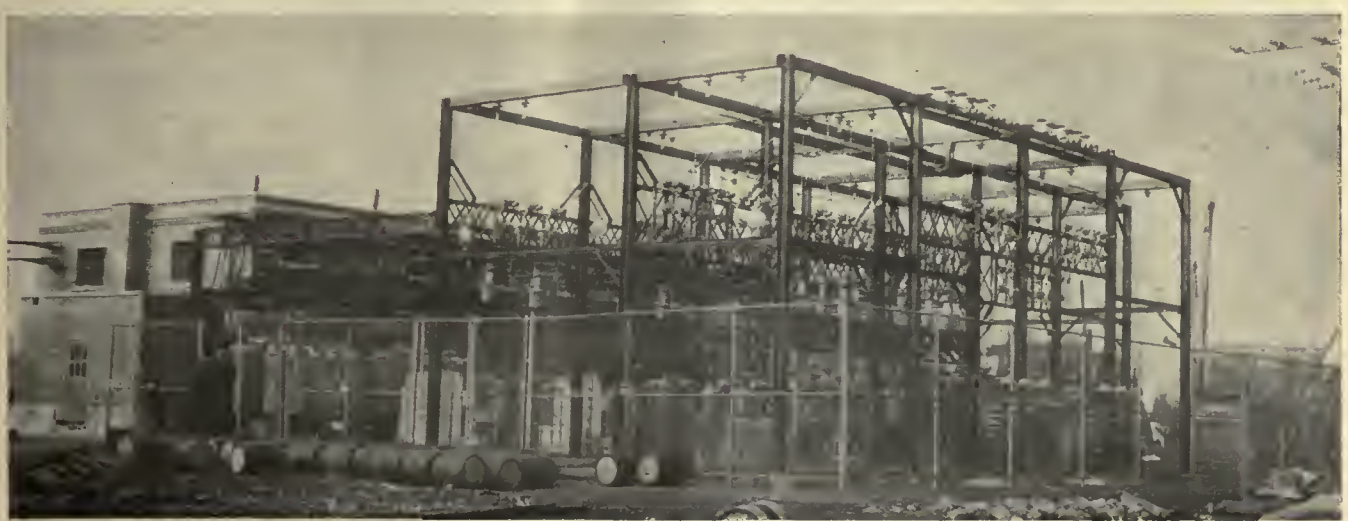
All auxiliary switches are normally closed. The procedure to put a rectifier in service is to close the a.c. circuit breaker, then the d.c. circuit breaker, check the voltage and close the main rectifier switch.

Work on the building at Bridgeport began March 27. The first unit was put in operation Aug. 15 and all were in operation by Sept. 26. No trouble of a serious nature has been experienced since these rectifiers have been in service. The longest interruption has been one minute, and in every instance where a rectifier has gone out of service the same unit has immediately been put back. There has been no radio interference and only slight telephone interference, which has now been eliminated.

An over-all efficiency of 93 per cent, including line losses, has been obtained since the rectifiers have been in operation.



Outdoor equipment at Stratford automatic substation, which is similar in design to the new Bridgeport substation



Outdoor equipment of new Bridgeport substation of the Connecticut Company, showing incoming 13,900-volt, three-phase, 60-cycle transmission lines, oil switches, circuit breakers, auto-transformers and main transformers



The broad window with visor above gives an attractive effect to the front end

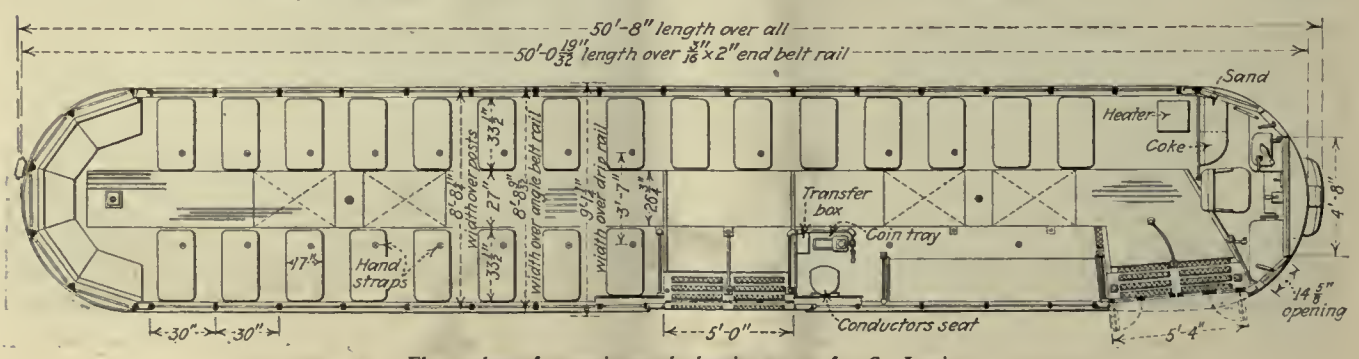
Aluminum Car Tested in St. Louis

Large front-entrance, center-exit, single-end car, designed for light weight and quiet operation in congested city service, is mounted on worm-drive trucks

SPEEDY, easy riding and attractive, the new car just placed in service by the United Railways of St. Louis should win customers and please the public. With a few exceptions the entire underframing is constructed of duralumin. This material has also been used in the construction of some of the equipment parts. The general appearance of the body is much the same as that of the cars now operated by the company. It is a single-end car and has front entrance and side exit. Streamline painting has been used to give a pleasing effect. The color scheme consists of a cream color above the arm rail, with orange below. The interior is natural

DIMENSIONS AND EQUIPMENT USED IN EXPERIMENTAL ALUMINUM CAR

Length over all	50 ft. 8 in.
Width over all	9 ft. 1¼ in.
Height over trolley board	10 ft. 11 in.
Side post centers	30 in.
Side glass	26 in. x 26 in.
Front-end glass	28 in. x 54 in.
Truck centers	24 ft. 6 in.
Truck wheelbase	5 ft. 6 in.
Journal centers	5 ft. 9¼ in.
Diameter of axles	4¼ in.
Diameter of wheels	26 in.
Worm-drive ratio	7⅝ to 1
Gage	4 ft. 10 in.
Type of truck	Timken Detroit with worm drive and differential axle
Motors	Four General Electric No. 1126, 35 hp.
Air brakes	Westinghouse automotive type with DH-16 compressor
Control	K-75-A
Line switch	General Electric No. 986
Seats	Hale & Kilburn No. 208 de luxe
Door operating mechanism,	National Pneumatic, safety interlocking
Interior trim	Cherry
Headlining	Agasote
Sash and sash fixtures,	O. M. Edwards Company
Car signal system	Faraday
Curtain fixtures,	Curtain Supply Company, Ring 88
Curtain material	Wyndasote
Destination sign	Hunter
Farebox	Johnson
Heater	Peter Smith hot air
Headlight	Ohio Brass
Step treads	Feralun (aluminum)
Sander	Nichols-Lintern
Register	Security
Handbrake	Automotive
Trolley catcher	Ohio Brass
Trolley base	U. S. No. 20
Seating capacity	60
Weight of truck including wheels and axles	4,302 lb.
Weight of gears, housings and brakes	1,240 lb.
Weight of G. E. No. 1126 motor	479 lb.
Weight of truck complete	6,500 lb.
Weight of body complete	19,554 lb.
Total weight	32,054 lb.



Floor plan of experimental aluminum car for St. Louis

cherry with cream ceiling. All woodwork above the windows is stippled to harmonize with the light ceiling and cherry trim.

Cross seats are used except for a single longitudinal seat at the front right-hand side, which provides for five passengers. With a semi-circular seat at the rear, the total seating capacity is 60. The cross seats are non-reversible. They have a cane covering trimmed with Spanish brown leather. Deep springs are used in the cushions and backs.

A cabinet houses the front-end control and air-brake equipment. A large front-end plate-glass window measuring 28 in. x 54 in. gives free vision to the operator. There is a metal visor, above which are roller signs to give the route number and destination.

Twenty-five 36-watt inside frosted lamps provide the illumination, and these, together with the light colored ceiling, give a very brilliant effect.

The car is arranged for either one-man or two-man operation. For use when operated as a one-man car there is a backing-up control equipment which is installed in an aluminum stanchion placed in the center at the rear of the car. A foot gong is also provided in the base of the stanchion. This arrangement of the control equipment makes it possible for the motorman to back the car without disturbing passengers.

The General Electric No. 1126, 600-volt motors have been designed especially for this purpose. They are considerably lighter and of smaller dimensions than the standard railway motor of the same horsepower. The four motors, rated at 35 hp. each, are spring suspended and connected to the axles by flexible propeller shafts and worm drive. Each motor is suspended longitudinally from the truck frame in such a manner that the mass consisting of the motor and part of the drive is spring supported. The driving connection between the motor and worm is made by means of a short shaft fitted with flexible couplings at its ends.

The axles are Timken Detroit, and the gear ratio is $7\frac{2}{3}$ to 1. To reduce the transmission of noise rubber has been used in many places, such as at the center plate and side bearings. The wheels are also of experimental design intended to reduce operating noise to a minimum. Copper jumpers provide a path for the electric current.

Brakes are of the internal expanding drum type having metal brakeshoes. They are applied by Westinghouse air diaphragms, an individual diaphragm being used for each brake. The brake drum is located approximately at the center of the axle, thereby equalizing the torque set up in the axle at each brake application. This particular design is used as a means to reduce noise and provide a more uniform braking of cars than is possible with the conventional brakeshoe on the wheel.

Comparison of the weights of the worm-drive truck with standard trucks operated by the company and equipped with the regular GE-265 traction motors shows that the worm-drive truck complete with two motors weighs about 1,000 lb. less, or 2,000 lb. per car.

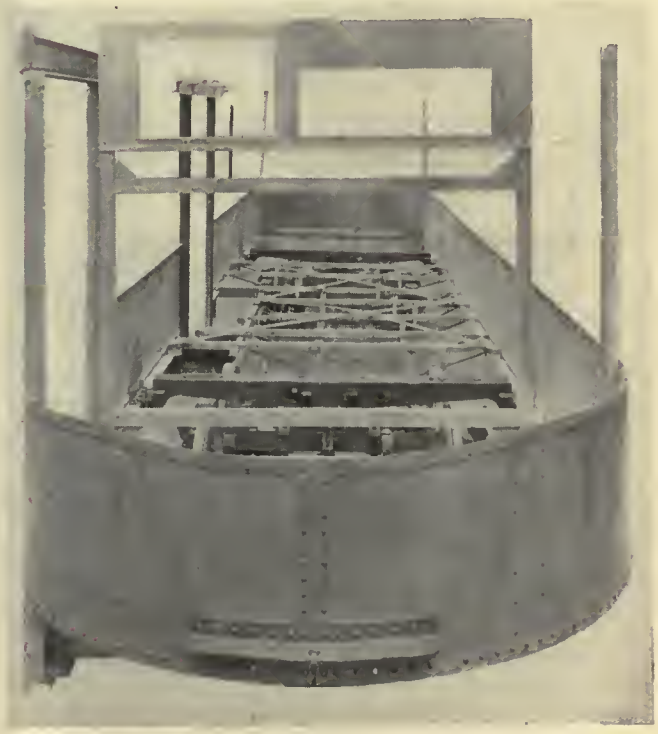
Particular attention has been given to keeping the weight low, so that this car weighs but 32,000 lb. as compared with 40,000 for other new types of cars operated by the company. While the cost of the car is somewhat greater than for previous types, it is expected that the saving in energy consumption will offset this increased cost. The first trial run was made on Oct. 25. Following this preliminary test of performance the car was exhibited in the main thoroughfares of the downtown district of St. Louis.



Seat cushions and backs are cane covered with deep springs. A trimming of Spanish brown leather gives a pleasing effect



The control and air-brake equipment is housed in cabinets at the front end of the car



The underframing was constructed almost entirely of duralumin





2



3

Route numbering and lettering are features of European electric railway and bus practice

1. This view was taken in front of the Bourse, or Stock Exchange, in Brussels, Belgium. This and the other views on this page show clearly the character of island platforms used extensively in Europe. They not only add to the safety of boarding and alighting, but shorten the length of car stops.

2. Two-car train on Kürfursterdamm in Berlin, showing island platform.

3. This practice of displaying schematic maps of car routes is very common in Europe and is of great assistance to strangers in getting about. This map is mounted on an island platform of the Dortmund Street Railway, Germany.

4 and 5. These views were taken in Naples and illustrate clearly some of the points already mentioned, namely, the street car marking by route numbers and lettering, and the island platforms. The square post in view No. 4 carries information about the car routes.





5



The London Underground management takes no chances that passengers will get on a wrong train. This station indicator at St. James Park station on the Metropolitan District Railway indicates by illuminated numbers the destinations of the next three trains which will stop at this station

Answering Questions Before They Are Asked

European electric railway and bus companies have developed a very effective method of signing their stopping points as well as their cars and buses

By Henry W. Blake
Senior Editor *Electric Railway Journal*

QUESTIONS about the service that are most frequently asked by a person wishing to travel by an electric railway to some destination are: Where can I get a car? How often do they run? How near does it go to the point I want to reach? How long does it take? How shall I know when I get there?

If the person is a regular patron of the line he knows the answers to these questions. If he does not travel regularly on the line and cannot get satisfactory answers to these inquiries, he will often ride in a taxi when a car or bus would have taken him to his destination just as quickly and more cheaply.

One of the principal features of European electric railway and bus practice to impress the visitor from America is the excellent ways in which these questions of intending and actual passengers are answered before they are asked. This may be due, in part, to the larger number of tourists in European cities and the consequently greater need to cater to this class of traffic. Be that as it may, it is very easy for a person in a European city to find the car or bus which will take him to any desired point, and where he can board it. After he does so he can learn from notices and maps on the car or bus when he is approaching his destination.

The principle upon which this method is based is the identification of all routes by numbers or letters which are carried in a conspicuous position on the car or bus. The same numbers also appear in maps distributed by the company of its different routes, on the stop signs to show which routes pass those points, on the backs of transfer tickets where routes have to be designated, and in other ways. The position of this number on the car and bus is usually on the hood, with often a list of the principal points passed on the route. The number and list are often repeated on the sign carried on each side of the roof.

In London the law requires all buses to carry such a list on both their front and rear ends, and the list must read downward in the direction in which the bus is going.





A feature of European electric railway and bus practice is that the route is clearly indicated on the vehicle by number and lettering

1 and 2. London buses carry route numbers at the front, rear and sides. They also display the principal points on the routes, on a large sign at the front and rear of the bus.

3. Car in Florence, Italy, in front of the famous cathedral. Route signs with number and lettering are carried on the front and on the sides.

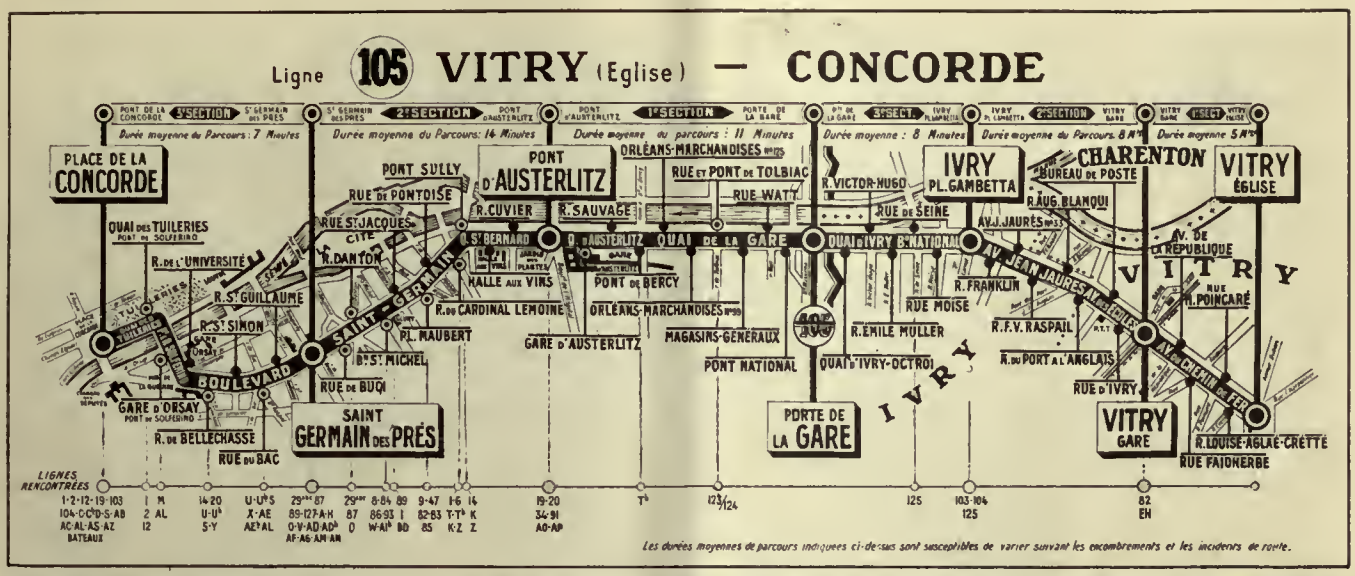
4. This view in Hamburg shows not only the route lettering and numbers on the front and sides of the car, but also (at the left) a stopping point post sign, carrying full information about all the lines passing that point. The view also shows an island platform, which is the rule, not the exception, at European stopping points.

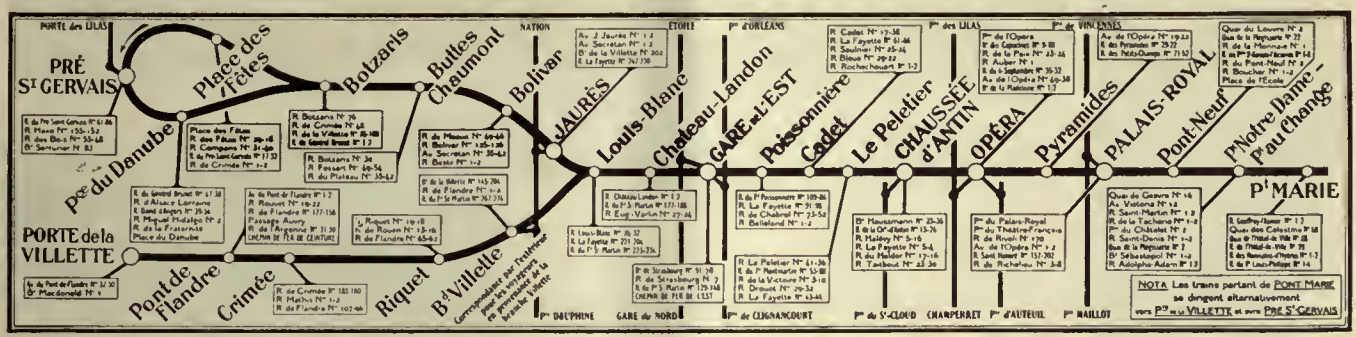
5. A car at Brussels. While advertising is carried at the side of the car, plenty of space is reserved on the hood for route numbering and lettering.











Route maps carried in Paris cars

The information given to the passenger does not stop after he boards his car. He is told the direction in which he is going, the stop at which he must get out to reach his destination, and other helpful information. The upper engraving shows the simple schematic diagram carried on the surface cars in Paris; a similar map is carried on the bus lines. This map gives in addition to the route, the route number, principal streets crossed, fare zones, average time of trip between different points, all connecting bus and trolley lines, etc. The chart below is a sample of one carried on the Paris rapid transit cars. While it necessarily differs somewhat from that carried on the surface lines, as there are no fare sections and a flat rate is charged, it is equally replete with information, showing even the nearest house number on the streets adjoining the subway stations.

In Paris, where both buses and cars are operated by the same company, the car routes are distinguished by numbers and the bus routes by letters, but as there are more bus routes than letters in the alphabet many of the routes have to be distinguished by two letters, like AB, AC, BD, etc.

The method described of route designation by carefully worked-out signs for cars is followed not only by the city railways, bus lines and rapid transit systems but by the steam roads in Europe as well. While the latter do not use route numbers they generously placard their cars with route and destination signs.

Publish Maps and Time-tables Also

The next part of the problem of merchandising transportation by route signs and numbers is to familiarize the public with these numbers and the routes to which they apply. This is done in Europe in several ways. One is to post maps and time-tables of the routes with the numbers marked on them at different places, particularly at the stopping points. Another is to distribute pocket maps of the city with the routes marked on them, accompanied sometimes by supplementary merchandising information, such as a list of interesting places to visit. Sometimes these maps are given away, as by the London Underground, London General Omnibus Company and London County Council Tramways. More often a small charge is made, as 2½ cents in Berlin. In Brussels, Paris and Rome somewhat more pretentious pamphlets are issued, giving besides a map much information about the lines. These pamphlets are sold at a very low price.

The London County Council supplements a plan of issuing maps and time-tables by having at two or three important traffic points a large map known as a "path-finder." On each side of the map are 20 or 30 buttons, each marked with the name of a place which a person might want to reach. When a button so marked is pressed, a row of lamps behind the map illuminates the route to that point. Particulars of this map were published in the issue of the JOURNAL for Sept. 3, 1927, page 395.

Stopping Points Marked

After learning what car he needs to take to go to his destination and the streets on which it runs, the next need of the prospective passenger is to know where he can board the proper car or bus. The points at which cars and buses stop to receive and discharge passengers are farther apart than is usual in the United States. The average distance in Paris is 250 m., or about 6½ to the mile, but an average of 79 continental city companies, quoted in a recent European convention paper, is 375 m., or 1,230 ft., nearly four to the mile.

In every European city these stopping points are very









Stop signs and stations in different cities in Europe

1. Stop sign on waiting platform in Paris. The stop sign is cylindrical in form with the letters of the routes passing that point conspicuously displayed.

2 and 3. Bus and street car stop signs in Berlin. Both give the numbers of the lines passing that point. The street railway stop sign takes the form of a square post, on which advertising is displayed besides the information about the car lines passing that point. The sides are translucent, so that the lamps inside make the wording easily legible at night. The advertising on the post illustrated in 3 helps defray the cost of their construction.

4. Stop signs in Naples, showing optional stops for eleven car lines.

5. Sometimes an attractive waiting station is erected at the stopping point, as at this location on the Avenue de Friedland, Paris. A skeleton map of the system is displayed in a frame, so that passengers can easily select their routes.

6. A simple waiting station and stop sign on the Avenue de la Toison d'Or, Brussels, quite near the office of the Brussels Tramway Company.

7. Waiting station on the Victoria Embankment near Westminster Bridge, London, for passengers waiting to take the cars of the London County Council Tramways.

8. Waiting station at Place Massena, Nice. Through cars are run from this station to many surrounding points, including Monte Carlo.











Rapid Transit stations in Paris are well signed

It is practically impossible for any person to go astray in the stations of the Paris subway system. The upper views show ticket booths in two typical Paris stations. The lower view shows a train platform. In the passageway and on the station platform signs give the direction of the trains stopping at that platform, the stations which can be reached by these trains and other data helpful to passengers.

clearly marked. Occasionally the marking is simply a metal sign, hung on the span wire in the case of a trolley line, or attached to the side of a house for a bus line. More often it is of ample dimensions, say 15x24 in., carried on an ornamental post set in the sidewalk or on an island platform. Stopping signs of this kind, as used in Paris, Naples and London and by the Berlin buses, are illustrated.

Such signs usually carry a list of the car and bus routes stopping at that point. In Italy and England these route numbers are painted on the board attached to the post supporting the stop sign. In Paris the route numbers are listed on each side of a cylindrical casing containing a lamp so that it can be read at night. The Paris view published is of a stopping point for both electric cars and buses, as shown by the fact that it carries numbers (electric car routes) and letters (bus routes). In Germany the most common form of electric railway stop sign is a built-up post with iron frame and glass sides, about 2 ft. square and 8 to 10 ft. high. The space on this post at about 5 ft. from the ground is given up to time-table and other information about the railway lines passing that point. The rest of the space on the post carries commercial advertising. This post, like the Paris signs, is illuminated at night.

Another feature of European stop points is the large number of raised platforms used. In fact, this type of loading platform is much more common in Europe than in the United States, possibly because heavy snow storms are not frequent in winter in Italy, France, Belgium, Holland and in a good part of Germany. Many of the systems also have waiting shelters at important boarding or transfer points. Views are given of typical stations of this kind in Paris, Brussels and Nice.

Information on the Car Also

European transportation companies do not think their duty of supplying information to the passenger ends when he is safely on the car or bus. He still wants to know where to get out. The Paris companies seem to give the most complete information on this point. Every car and every bus carries a schematic map of its route. That of electric railway route No. 105, or from Vitry to Place de la Concorde, is reproduced. It shows not only the car route very plainly, but also all points of interest passed, like railroad stations, all cross streets, and also, at the bottom, all points of transfer to bus and other street railway routes. The bus routes are indicated on the map by letters such as "AC," "AL." "AF," etc., and the car routes by the numbers.

At the top of the map information is given of the length of time taken in minutes between different points, and the limits of the different fare sections. In addition to this map each car also carries a small poster with somewhat duplicate information, though without a map, such as the streets crossed, those at which stops are made,



* ARRÊT OBLIGATOIRE

Ligne n° 105 — VITRY — CONCORDE

DANS VITRY-SUR-SEINE
* L'ÉGLISE
RUE LOUISE-AGLAÉ-CRETTÉ
RUE HENRI-POINCARÉ
RUE FAIDHERBE
AVENUE DE LA RÉPUBLIQUE
* LA GARE
RUE D'IVRY
BUREAU DE POSTE
RUE DU PORT-A-L'ANGLAIS
DANS IVRY-SUR-SEINE
RUE AUGUSTE-BLANQUI
RUE F.-V.-RASPAIL
AVENUE JEAN-JAURÈS, N° 33
RUE FRANKLIN
* PLACE GAMBETTA
RUE MOÏSE
* RUE DE SEINE (FACULTATIF DIRECTION VITRY)
RUE ÉMILE-MULLER
RUE VICTOR-HUGO
QUAI D'IVRY-OCTROI
DANS PARIS
* PORTE DE LA GARE
PONT NATIONAL
RUE WATT
MAGASINS GÉNÉRAUX
* RUE ET PONT DE TOLBIAC
ORLÉANS-MARCHANDISES, N° 99
ORLÉANS-MARCHANDISES, N° 125
* PONT DE BERCY (FACULTATIF DIRECTION VITRY)
RUE SAUVAGE
* GARE D'AUSTERLITZ
* PONT D'AUSTERLITZ
RUE CUVIER
HALLE AUX VINS
* PONT SULLY
* RUE DU CARDINAL-LEMOINE
RUE DE PONTOISE
* PLACE MAUBERT
RUE SAINT-JACQUES
* BOULEVARD SAINT-MICHEL
* RUE DANTON
* RUE DE BUCI
* SAINT-GERMAIN-DES-PRÉS
RUE SAINT-GUILLAUME
* RUE DU BAC
RUE SAINT-SIMON
* RUE DE BELLECHASSE
RUE DE L'UNIVERSITÉ
* GARE D'ORSAY (PONT DE SOLFÉRINO)
* QUAI DES TUILERIES (PONT DE SOLFÉRINO)
* PLACE DE LA CONCORDE

SECTIONS ET TARIFS

De VITRY (Église) à :	1re Cl.	2e Cl.	Passengers per car	Metres	Metres per ticket
VITRY (Gare)	0 50	0 35	0 50	0 35	0 30
IVRY (Place Gambetta)	0 75	0 50	0 90	0 35	0 30
PORTE DE LA GARE	1 10	0 65	0 65	0 70	0 30
PONT D'AUSTERLITZ	1 85	1 35	1 45	1 05	0 65
SAINT-GERMAIN DES PRÉS	2 10	1 60	1 70	1 05	0 65
PLACE DE LA CONCORDE	2 35	1 85	1 85	1 20	0 80
De VITRY (Gare) à :					
IVRY (Place Gambetta)	0 50	0 35	0 50	0 35	0 30
PORTE DE LA GARE	0 75	0 60	0 75	0 50	0 30
PONT D'AUSTERLITZ	1 50	1 10	1 25	0 85	0 65
SAINT-GERMAIN DES PRÉS	1 75	1 35	1 50	0 85	0 8.
PLACE DE LA CONCORDE	2 »	1 60	1 75	1 »	0 80

D'IVRY (Place Gambetta) à :	1 0	2e Cl.	Passengers per car	Metres	Metres per ticket
PORTE DE LA GARE	0 50	0 35	0 50	0 35	0 30
PONT D'AUSTERLITZ	1 25	0 85	1 »	0 70	0 65
SAINT-GERMAIN DES PRÉS	1 50	1 10	1 25	0 70	0 65
PLACE DE LA CONCORDE	1 75	1 35	1 60	0 85	0 80
De la PORTE DE LA GARE à :					
PONT D'AUSTERLITZ	0 75	0 60	0 80	0 35	0 35
SAINT-GERMAIN DES PRÉS	1 »	0 75	0 85	0 35	0 35
PLACE DE LA CONCORDE	1 25	1 »	1 »	0 50	0 80
Du PONT D'AUSTERLITZ à :					
SAINT-GERMAIN DES PRÉS	0 75	0 60	0 60	0 35	0 35
PLACE DE LA CONCORDE	1 »	0 75	0 85	0 35	0 35
De St-GERMAIN-DES-PRÉS à :					
PLACE DE LA CONCORDE	0 75	0 60	0 60	0 35	0 35

This supplementary chart carried in the Paris surface cars gives all stops, fare section limits, fares and other information

and the rates of fare for the several sections. It is of enameled metal.

Similar maps are carried in the Paris buses. In London full information about the route and rates of fare is given in posters carried inside the buses and cars, but maps are usually not included.

Station Indicators of Rapid Transit Lines

The rapid transit lines are as thorough in signing their stations and cars as are the surface lines. Indeed, the information given is even more elaborate than on the surface lines because an alighting passenger is less able to identify the point where he may happen to be by his surroundings.

In Paris, every station has its name prominently displayed in several places and also the direction of the trains passing each platform. The direction is indicated by naming the terminal station. Many stations are transfer points, and where this is the case and the passenger walks from one station to another, the passageways are very clearly marked. A recent improvement has been the introduction in a number of the passageways leading to a station of an automatic gate which closes when a train is about to enter a station. In this way the danger of passengers arriving late and attempting to board the car while in motion is prevented. The operating mechanism of this gate is an electric motor with worm gear and pinion. Passengers are warned by a sign not to attempt to pass through to the station platform while the gate is closing. After the train has left the platform the gate opens automatically.

Paris has only one route on which there are any branch terminals. Hence, there is little need for changeable platform route indicators. However, these have been developed to a marked degree on the London Underground lines. The latest form is the indicator at St. James Park Station, illustrated on page 1151. Here fifteen routes are indicated on the indicator board and illuminated numbers show in advance of the arrival of each train the destinations of the next three trains. With such definite information before him it is hardly possible for any underground railway passenger to go astray.

Rapid Transit Cars Also Carry Maps

All rapid transit cars in both Paris and London also carry maps. One of those used in Paris is reproduced, as it is somewhat different from the form of map used on the Paris surface cars and buses.

Two of these maps are carried in a frame in the center of the car back to back so that they can be seen by passengers in all parts of the car. The route shown is No. 7, in the form of a "Y." The heavy line shows the route, the cross lines, printed red on the map, show connections. The lettering in the panels at each station gives the names of the streets close to that station, with the nearest house numbers. On the outside of the train, the direction is shown not only by light markers but by lettered signs on the front and rear ends of the train, by lettered signs on each car, so placed that they can be read from the platform and by color markers inside the car similar in color to those on the ends of the car. All of this is in addition to elaborate lettering and illuminated signs on the platform.

On the London rapid transit lines much the same system of illuminated maps with supplementary printed lists of stops for use within the car is followed. Hamburg goes a step further on its rapid transit system and paints a map of the route on the ceiling.

Automatic Crossing Gate Developed by North Shore Line

ELECTRIC highway crossing gates which are lowered automatically by the approaching train itself by completing a track circuit have been in operation without a single failure for more than two months on the Wheeler Road crossing of the Chicago, North Shore & Milwaukee Railroad, near Libertyville, Ill. The gates were installed as an experiment and are proving even more reliable than those operated by hand.

There are two gates, 10 ft. long, operated by electric motors. They are placed on the traffic sides of the highway approaching the crossing and are equipped with warning bells and red signal lights. Two signal relays are sufficient to operate them. The track circuits



The gate is flexibly supported so that it is swung aside by an automobile without damage, afterward returning to its normal position

controlling the gates can be extended to any distance away from the crossing. Warning can be given at least 35 seconds in advance of a train at the highest speed operated. At this particular location the circuit is completed by approaching trains when 2,200 ft. from the crossing.

The approaching train operates the relays, which start the warning bell and the signal lights at from eight to ten seconds before the gates are lowered. Should an autoist fail to regard the signals and crash into the gate the impact would not damage the gate, but would swing it around parallel to the road. Springs in the upper case of the gate posts provide for such emergencies. The gates would not be in the path of the train as their base is set back far enough from the track. After the automobile passed the gate would swing back to its normal position. The gate mechanism would not be injured should the gate drop directly on an automobile, as it has sufficient slack in its parts to relieve the strain on its motor. The danger of a failure is reduced to a minimum as the track circuits employed are the same as the standard signal circuits.

For the purpose of accurate tests, the relay box is now equipped with a needle indicator, having a chart graduated into fifteen-minute periods. It is operated by six dry cells and is connected with a mercury tube on the gates. When the gates are lowered the mercury closes contacts and completes a circuit which operates the indicating needle on the chart. Thus a record is kept automatically of the time each train passed and

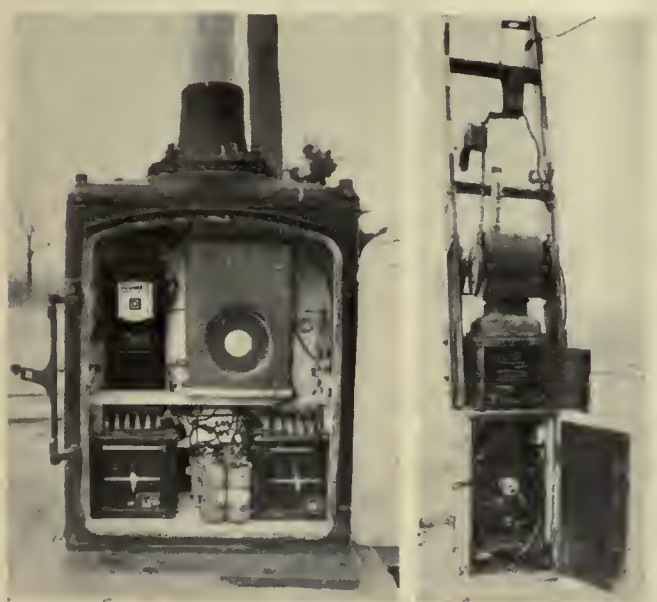


Automatic gate at the Wheeler crossing on the North Shore Line in normal position. It is lowered by a motor on the base controlled by a track circuit

whether or not the gates functioned at that time. A signalman needs to make but one trip in 24 hours to change charts and inspect the gates.

W. G. Fitzgerald, signal supervisor, is planning for a reserve source of power to be used in case of emergency. The gates are now operated by commercial alternating current. Should a failure occur on the a.c. circuit operating the gate motors, due to lightning or other causes, a power-off relay, operated by direct current from the trolley, would instantly set signals against approaching trains. The actual failure of the a.c. circuit itself would cause the power-off relay to set signals against trains.

Although still in the experimental stage, the new gates give promise of solving the old problem of furnishing crossing protection without the risk of the uncertain "human element" and without the prohibitive cost of elaborate automatic gates. Various forms of this gate have been used before by other railroads, but they necessitate manual operation. It is believed that the North Shore Line is the first to use this particular type of automatic gate.



At left, interior of relay box, showing both relays, the indicator and its batteries. At right, interior of the gate post for the automatic highway crossing gate. Below is the motor operating the gate; above are the springs which allow the gate to swing sideways when struck by a vehicle

Twenty-one Waiting Stations for Passengers in St. Louis

LOCATED at various points on the property, the St. Louis Public Service Company now has 21 combined shelters and refreshment stands, according to the brief submitted by it for the 1927 Coffin Prize. They are in the outlying districts, as well as at the more important intersections and transfer points where passengers are apt to be waiting for cars, and are built on company property.

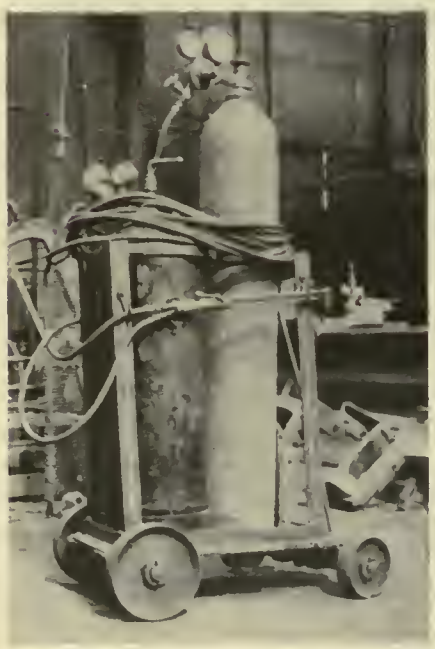
They were built under the late receivership and after one station, so established as an experiment, had proved successful. This station was erected at the terminus of one of the lines where the company had maintained an open shelter of the sort usually found along electric lines in such districts. To improve this condition it offered ground at a reasonable rental on which the lessee was to erect at his own expense a modest structure where coffee, soda, beverages, confections and tobacco could be sold and space would be provided for a waiting room for passengers. The building to be erected by the individual remained his property and the lease stipulated that on termination of the lease the lessee would remove the building and replace the property in the same condition as he found it. In other words, the company was to furnish the customers for his business and in return he was to furnish, at his expense, the quarters to shelter the passengers as well as his own electric light, water and heat. In many of these buildings the tenant also furnishes the toilet facilities.

Arrangements like these now not only provide the 21 waiting stations for passengers mentioned but also bring in an income to the railway company from ground rentals of about $4,000 per year without any expense whatsoever to the receiver. The leases are drawn for a short period only and may be terminated by the receiver at any time that the ground may be needed for other purposes.

Maintenance Methods *and* Devices

Truck for Welding Outfit

DUE to the accidental destruction of the hand truck purchased originally with the oxyacetylene outfit used in the Woodside shop of the New York & Queens County Railway, New York City, it was found necessary to construct immediately another truck in order that the welding work would not be delayed. The truck shown in the accompanying



This truck was cheap to construct and has given excellent service

illustration was designed to meet this emergency. It was built out of standard structural shapes easily obtainable.

The platform of the truck is made from a solid piece of ½-in. plate, 30 in. long and 16 in. wide. Square axles made of 2-in. stock are equipped with rear wheels of 10 in. diameter and 2 in. face and front wheels of 7 in. diameter and 2 in. face. The wheels are spaced at 20½-in. centers and the axles 22-in. centers. The rear axle is bolted to the platform and the front axle to a horizontal round plate which makes contact with a similar plate fastened to the platform. This provides a swivel bearing for free circular movement. Four pieces of 2-in. angle are welded to the platform, forming a base structure 25 in. long and 13 in. wide. A 2-in. angle 25 in. high is welded to each corner of this base. These four angles are reinforced by a ⅜x2-in. flat bar welded to the top of the uprights on the 13-in. sides and two ½x1-in. flat bars shaped to fit the contours of the truck and welded to the uprights on one of the 25-in. sides. A ⅜x1-in. bar shaped to fit the truck is placed on the other 25-in. side. This fits into clips and is removable to allow for the replacement of the ¼-in. round iron hook installed on the front uprights which provides a support for the truck when not in use. For easy transportation of the truck there is a handle 4 ft. 6 in. long and made of ¾-in. round iron.

Speaking of "canned heat"—tie a can on your hot bearings and make it a full oil can.

Cleaning Systematized at Los Angeles

CAR trucks, together with various fittings, are cleaned carefully during overhauling at the shops of the Los Angeles Railway, Los Angeles, Cal. For preliminary removal of dirt and grease, a mixture of cleaning solution with steam under pressure is sprayed over the trucks before the parts are dismantled. This is much quicker than the old method of scraping off the grease by hand.

All journal, axle and armature bearings are cleaned before going to the babbitting shop for rebabbitting. A tank 2½ ft. x 3 ft. x 5 ft. is used for small parts which can be handled without the use of a crane. The cleaning solution used in the tank comes in a powdered form and is mixed in a proportion to give desired results.

A larger tank 3 ft. 2 in. x 5 ft. 8 in. is used for large, heavy parts such as motor frames, gears and complete rear ends of buses. Nuts, bolts, trolley wheels, washers, journal and axle bearings and other small parts are placed in a heavy wire mesh basket and lowered into the tank.

The three tanks used in connection with this work are heated with steam radiating coils of sufficient size to bring the solution to the boiling point in about 30 minutes. Parts are left in the tanks from 30 minutes to three hours, depending on their condition.

Setting Poles Under Heavy Traffic Conditions

By R. M. Cobb

Construction Foreman Electrical Department, Pacific Electric Railway

UNDER very heavy traffic conditions a total of 79 poles were set in less than three days by forces of the Pacific Electric Railway on Ocean Avenue, Long Beach, Cal. Owing to the location, it was necessary that the poles be in true vertical position after the load of span attachment was applied.

The resulting strains on the poles due to the weight of the overhead construction were predetermined. With this quantity known the rake at which the poles were to be set for different span lengths was calculated and a curve was plotted for use of the line crews. The spans varied in length from 90 to 135 ft. and in consequence it was necessary to set the poles at different rakes for the different span lengths, so that when the load was applied the rake would just offset the normal deflection due to the load.

Holes for the poles 3 ft. square were dug by hand for the first 2 ft. Then the remaining 4½ ft. was dug by a machine in a circular form with a diameter sufficient to allow 6 in. of concrete between the base of the pole and the outside of the hole.

Special pike poles were used to line up the poles. The ones used consisted of a piece of round wood about 3½ in. in diameter and 12 ft. long, on the end of which was an iron fork, the tines being bent to a diameter slightly larger than the pole. These tines were covered with friction tape to prevent slipping.

Blocks were placed in the bottom of the hole far enough apart to catch the weight of the pole and still allow the drainage necessary to prevent accumulation of moisture and consequent deterioration from rust.

When the hole was ready the pole, 40 ft. long and weighing nearly 2,000 lb., was raised by a derrick and placed in the hole ready for alignment. In raking the poles against the span strain a 5-ft. straight edge was placed on the front side of the level with a graduated screw adjustment. This was used to obtain the proper

rake as was indicated on the plotted curve used by the crew. A variation of 0.1 in. in 5 ft. was obtained on some poles. This small variation was due to the small difference in length of span and consequent amount of weight support.

When the poles were raked properly the ells for street lighting conduits were placed by means of templets and the remaining excavation was filled in with concrete of a 1:2:4 mixture. About 1 cu.yd. of concrete was required for each hole.

Before taking the pike poles away it was necessary to support the pole in some manner to prevent the weight moving it out of alignment. This was accomplished by driving a wedge on the back side of the pole at the sidewalk line.

Proper Method of Packing Bearings

By Jesse M. Zimmerman
Renewal Parts Engineer Westinghouse Electric & Manufacturing Company

PROPER packing of bearings has an importance seldom appreciated. Bearings are often placed in service with improper packing. The function of the waste wick is to provide a direct path from the oil chamber to the window. When packing bearings the following points should be observed carefully:



Armature bearing housing with waste chamber cut out to show proper method of packing

1. A wick should be prepared from a good grade of long strand wool. This wick should be long enough to reach from the bottom of the oil chamber to the top of the waste chamber and should be wide enough to cover perfectly the entire area of the window.

2. The wick should be placed in the waste chamber so that it will reach from the bottom of the oil chamber and cover the entire window.

3. A sufficient quantity of waste should be tamped behind the wick, using care to force the wick firmly against the journal in the window.

4. A separate wad of waste should be placed on top of the main body of the waste to keep the dirt out.

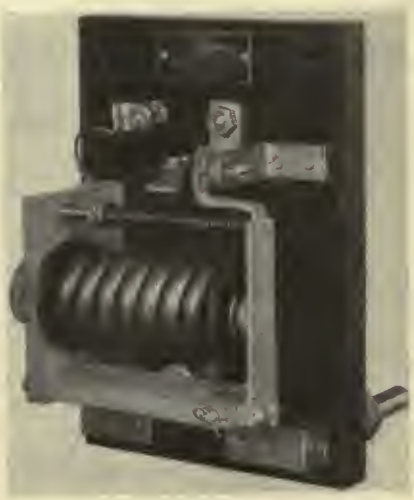
New Equipment Available

Motor Resistor Heater

CURRENT taken by car motors during acceleration is used for heating the interior of cars by means of a motor resistor heater just announced by the Consolidated Car Heating Company, Albany, N. Y. The heater shown in the accompanying illustration has one motor resistor heater unit and one standard sheath wire heater unit, mounted in the same casing. The motor resistor heater unit consists of an element containing a nichrome wire resistor embedded in insulating powder. This is subjected to a swedging process, whereby the outside diameter of the pipe is reduced, thus compressing the insulating material into a solid mass. Cast on the outside of the pipe is an aluminum fin to provide ample radiating surface for the heat generated within the resistor. This unit is secured to the heater by suitable clamps, one of which is a slip connection to allow for expansion and contraction of the element. The heavy lead wires are carried through the ends of the heater by porcelain bushings.

The motor resistor heater is an entirely new development in car heating and makes possible great economy in the use of current. The new and important function of the heaters is to remove the regular heater load from the peak load, and at the same time contribute a portion of the heat necessary to heat the car.

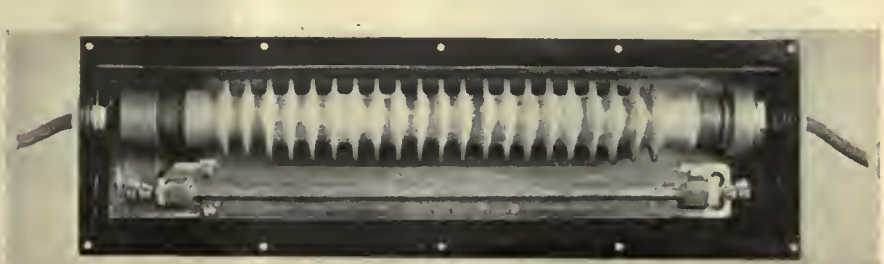
These heaters provide the resistance for the motors and have the same values as the external resistance mounted underneath the car, which is used in the summertime. Transfer from the inside to the outside resistors is made by means of a transfer switch. A peak load relay is in the resistor heater circuit. When the motor resistor heaters are operating, that is, when the car is being operated with the resistance in the motor circuit, the peak load relay is energized and short circuits the magnetic



Relay used to cut out car heaters when motor resistor heater is used

switch controlling the regular heaters, thus cutting them out. If the temperature of the car is below the temperature at which the thermostat cuts the heaters out, they will come into service again automatically as soon as the car motors cease to run on resistance.

The two sets of heaters are never in operation at the same time. The regular car heaters are cut out when the motor resistor heaters are operating, and they will be operating at all times when the motor resistor heaters are not operating, except when they are cut out by their thermostatic control. This effects a saving in two ways. First, by taking the normal heater load off the peak load of the car and consequently off the peak load



The regular heater spindle is shown at the top and the motor resistor heater unit at the bottom

of the power house; second, by supplying heat during the time that the regular heaters are cut out. This supplementary heat reduces the amount of current the regular heater equipment would take if the motor resistor heaters were not used. In other words, the peak load is reduced and the hourly consumption of electric heaters is also reduced.

The motor resistor heater shown in the accompanying illustration is of the panel type, but these heaters are also furnished in cross-seat and truss plank designs.

The safety heater switch used in connection with this equipment contains the fuses and cannot be opened when the switch is closed. Furthermore, the switch cannot be closed when the box is open. The switch mechanism is of the toggle type, with magnetic blowout, and a heavy barrier protects the fuses. The movement of the switch is such as to provide a good wipe at the contacts. An important feature of the construction is that the switch blade is thrown mechanically when it is opened. It is therefore impossible for the switch to remain in when the handle is thrown to the off position. These switches are furnished in various capacities up to 75 amp. at 600 volts. They are neat in appearance and every part is substantially constructed to withstand hard usage.

Run down brakes—
Break up cars.

Machines for Undercutting Commutator Segments

FOR undercutting mica between commutator segments of railway motors two machines have been introduced recently by the General Electric Company. One is a simple portable outfit which can be moved readily to any part of the shop and clamped to the armature shaft; the other is a stationary shop tool.

The portable outfit has adjustable stops which limit the travel of the saw to the brush surface of the commutator and is equipped with a floating drive shaft which permits the grooving of a number of slots at one setting of the armature. It also has an angular adjustment to compensate for commutator bars not exactly parallel to the shaft. A slight tap with the hand readily shifts the saw from slot to slot as the clamp is lined and will not mar the armature shaft. The driving shaft is equipped with universal toggle joints and can be furnished for either belt or motor drive.

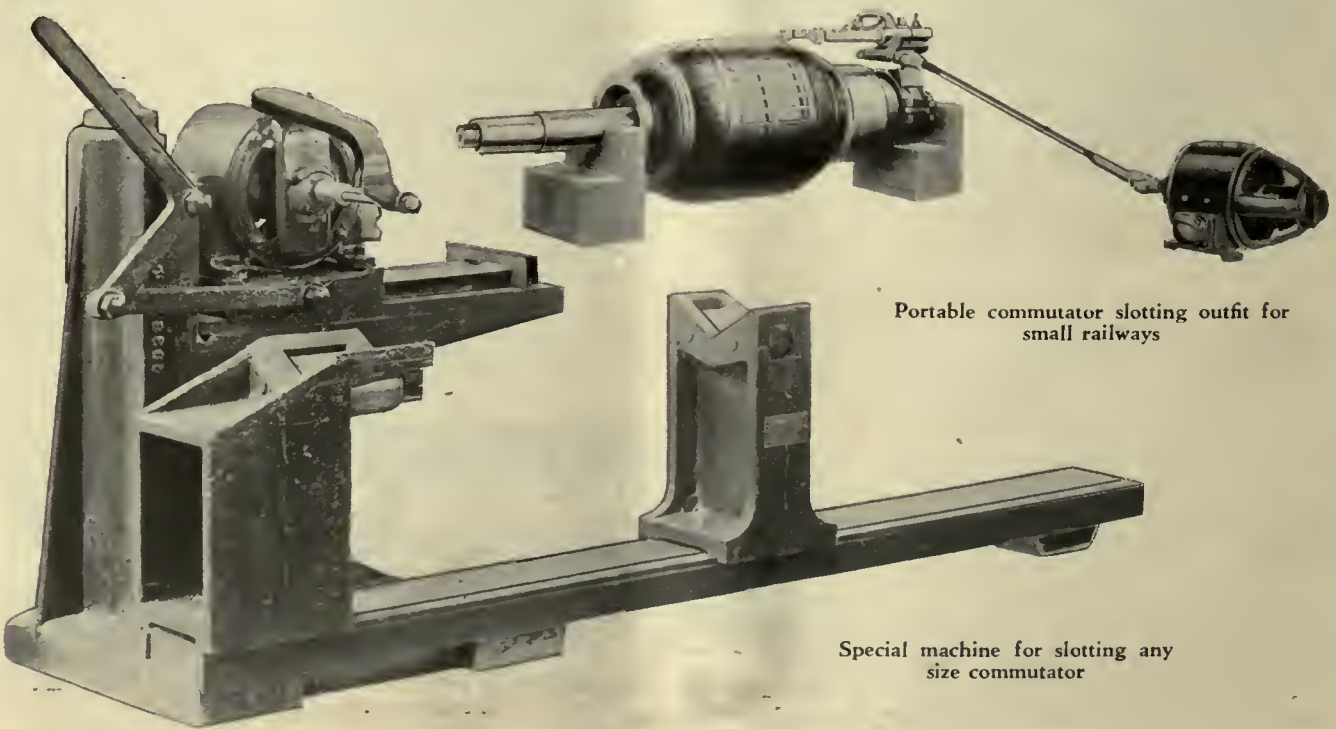
The stationary machine has a base which is provided with adjustable pillow blocks having V-shaped bearing surfaces with brass rollers for carrying the armature. Both vertical and angular adjustments are provided, the latter adjustment to be used where the commutator bars are not exactly parallel to the shaft. The circular saw is mounted on the end of the motor shaft and is supported by an offset bearing, which permits the grooving of commutators having ears. Hand scrapers are designed and shaped to remove the fins on the mica insulation, also burrs and sharp corners on segments which are left in the grooves by the slotting machine. This work is done by drawing the tool along the slot after the commutator has been smoothed off by a No. 3 Stellite machine cutting tool. The commutator should be given a final polished finish with sandpaper and blown clean.

Portable Grinder and Buffer

BALL BEARINGS for the motor and roller bearings for the grinding spindle are features of a ½-hp. portable grinder and buffer just announced by the Hisey-Wolf Machine Company, Cincinnati, Ohio. This tool is equipped with the new Hisey two-pole switch which provides convenient control at the grip handle. The ½-hp. motor, constructed especially for heavy-duty service, is of the universal type operating either on direct or alternating current. An adjustable cast-steel wheel guard can be placed at any angle most convenient for the operator. The end cover is readily removable and affords quick renewal of grinding wheels.



One-half horsepower portable grinder and buffer



Portable commutator slotting outfit for small railways

Special machine for slotting any size commutator

American Association News

1928 Convention Goes to Cleveland

Selection made by policy committee after carefully weighing the possibility of completion of new convention hall at Atlantic City. Adequate car exhibit next fall considered vital to industry

CLEVELAND was again selected as the location for the annual convention of the American Electric Railway Association, which is to be held during the week of Sept. 22-28, 1928. This decision was reached at a joint meeting of the policy committee and the sub-committee on convention contract held at association headquarters in New York on Dec. 16.

The decision was made only after the fullest investigation, study and discussion by the several committees which have had the matter of plans and location for the 1928 convention in hand. There was a considerable sentiment in favor of Atlantic City as the convention location, attributable largely to the natural attractions of the seashore resort. There was, however, grave doubt as to the wisdom of selecting the next convention location on the basis of Atlantic City's general popularity, with no definite assurance of the completion of the new convention hall there and particularly in view of the assured superior facilities in Cleveland for a representative exhibit of progress in cars and equipment. Such an exhibit, it was felt, is of vital importance at the present time because of its influence in stimulating the recovery and rehabilitation of the industry.

The committee had great doubt as to the actual completion of the new Atlantic City exhibit hall in time for the 1928 convention. Even if the actual construction work were completed by close adherence to the best possible schedule, the task of staging a large convention, such as that of the American Electric Railway Association, immediately after the completion of actual construction work would be attended with many difficulties and complications, jeopardizing the success of the convention. The occurrence of any unexpected delay in the construction program, on which there is still a large amount of work to be done, might easily delay completion of the new hall in Atlantic City until after the 1928 convention date. The substitute facilities available, in the event this should happen, were not considered satisfactory by the committee, and it therefore decided that the best interests of the industry and the association dictated the selection of Cleveland again for the next convention.

J. H. Alexander, president Cleveland Railway, and L. C. Dickey, manager of the Cleveland Public Auditorium, described the new facilities which will be available in that city next fall. New wings have been added on the north and south ends of the auditorium and a new entrance has been arranged. A number of large and attractive meeting rooms will be available in the new wings, and it will therefore be unnecessary to use any part of the annex for meeting rooms as was done in previous years.

Action of the joint meeting of the policy committee and the sub-committee on convention contract in selecting the convention location completes the preliminary work for the next convention which was taken up immediately after the last Cleveland meeting. The committee on convention location held its meeting in November, when it was decided that the 1928 convention would include exhibits. This committee also set the date for the last week in September. At that time, options expiring Jan. 1 were secured on the Cleveland Public Auditorium and on the new auditorium in Atlantic City. Because of the uncertainty then existing regarding the date for completion of the Atlantic City building final choice between Atlantic City and Cleveland was left to the policy committee. Since the meeting of the latter was held only a short time before the expiration of options, it was impossible to delay decision until more definite assurance of the completion of the Atlantic City building could be obtained. A delegation headed by A. H. Skeen, manager of the Atlantic City Convention Bureau, outlined the situation regarding the facilities there, and a separate report was made to the committee by independent engineers who had made a study of the building operations. The committee made its decision after full investigation of the Atlantic City and Cleveland proposals.

COMING MEETINGS OF *Electric Railway and Allied Associations*

Jan. 6—Metropolitan Section, A. E. R. A., Engineering Societies Building, 39 W. 39th Street, New York, N. Y., 8 p.m.

Jan. 16-17—Midwest Electric Railway Association, Hot Springs, Ark.

Jan. 18-19—Kentucky Association of Public Utilities, annual meeting Brown Hotel, Louisville, Ky.

Jan. 18-19—Central Electric Traffic Association, Hotel Gibson, Cincinnati, Ohio.

Jan. 25—Central Electric Railway Master Mechanics' Association, Hotel Gibson, Cincinnati, Ohio.

Jan. 25-27—Electric Railway Association of Equipment Men, Southern Properties, Roosevelt Hotel, New Orleans, La.

Jan. 26-27—Central Electric Railway Association, Hotel Gibson, Cincinnati, Ohio.

Jan. 31—New York Electric Railway Association, annual meeting. Hotel Commodore, New York, N. Y.

SEPT. 22-28, 1928

American Electric Railway Association, 47th annual convention, Cleveland, Ohio.

Rail Corrugation

RESULTS of a study of wheel-rail contact pressures were presented at a meeting of way and structures committee No. 12 on rail corrugation held at association headquarters, New York City, on Nov. 28. Data for these studies were secured by permitting one wheel of a car to run over a strip of manila paper. A relation between paper thickness and compressing force was established by some tests in a compression testing machine. The study showed that even with new rails and car speed of 10 or 12 m.p.h. the wheel-rail pressures are likely to vary between ranges of the order of one to four.

As to the corrugraph data on the track sections which are now under observation it was decided to secure three more sets of corrugraph readings: One set to be taken before the first of the year, another set early in the spring and a last set some time in June. With reference to the analysis of these data it was decided that it should await the June collection of data.

In the remaining work on the sections which are now under observation it was suggested that pains be taken to observe:

1. If the corrugation waves, where both rails are corrugated, have their crests opposite each other or whether a crest on one rail is opposite to a valley on the other rail.

2. The rate of growth of corrugation, if such a thing as growth exists, along the rail in both directions.

With reference to experimental track sections it was suggested that committee members representing operating com-

panies should, when it is feasible to do so, in building new track or reconstructing old track, try out the various mitigating methods suggested in the report of the committee for last year. Among the mitigating methods suggested were tilting of the rails to secure a more uniform wheel-rail contact, planing of the rail head at the mill, grinding of the rail surface after the track is constructed but before cars are operated over it.

Attention was called to the fact that the Pittsburgh Railways is building some track with planed rails.

Mr. Williams suggested taking up some of the rails in a section which now corrugates badly and rebuilding the track following the several suggestions for corrugation mitigation.

Mr. Wysor suggested building a toy or small scale experimental railroad for investigation purposes. This matter was discussed at some length but no formal action relative to it was taken. It was suggested that the secretary request Messrs. Lavan, Fehr and Nardini to look over the resilient track which is being tried out in Denver in case they happen to visit the Denver property.

Mr. Ormondroyd reported that with the co-operation of the Pittsburgh Railways he had made some observations on track deflection, but as these observations were not very satisfactory he is planning to secure a second series of deflection readings. He also reported on some tentative calculations on track and rolling stock vibration periods.

The secretary also reported some data secured from vibration calculations.

It seems from the work so far done that both vertical and torsional vibration frequencies come within the zone of frequencies likely to assist in the production of corrugation.

From the calculations so far made it does not appear that the gyroscopic action of the wheels is an important contributing factor.

The foreign committee's report relative to improvement of rail quality was discussed at some length.

In the matter of the rails, now in the track on Jefferson Avenue, Detroit, where the rails from one mill show a markedly greater tendency to corrugate than the rails from another mill, Mr. Williams agreed to prepare tension specimens according to A.S.T.M. specifications for Mr. Ormondroyd, who agreed to have them tested for total work of rupture in the testing laboratories of the Westinghouse Electric & Manufacturing Company. Mr. Williams agreed to furnish data relative to temperature variations of rails laid in paved track.

It was agreed that the chairman write Mr. Dalgleish, president of the Engineering Association, relative to the project and suggest that at least three more equipment men be appointed on the committee.

In connection with Mr. Fehr's suggestion of vibrograph studies on track over which new and present types of cars are operated, Mr. Ormondroyd agreed to make such studies as soon as the Pittsburgh Railways places its new cars in operation.

It was agreed that oscillographic studies of vibration of both track and rolling stock are advisable and that the committee attempt to secure the use of a suitable instrument.

The secretary presented the results of a study of wheel-rail contact pressures.

It was decided that another meeting of the committee should be held about May 1, 1928.

Members present were W. W. Wysor, chairman; C. H. Clark, H. J. Tippett, H. S. Williams, C. R. Kinnear, A. M. Nardini, J. Ormondroyd and D. D. Ewing.

Rectifier Committee Outlines Work for Year

SPECIAL committee No. 2 of the power division on mercury-arc rectifiers held its first meeting of the year at association headquarters, New York City, on Dec. 7.

After discussing the 1927 report on the subject of rectifiers, which was prepared by a sub-committee of the power generation and conversion committee, the committee decided to conduct its work for the present year on the following lines: (1) It will attempt to set up definitions and standards which will serve as a means of crystallizing the ideas of the committee members. (2) The committee will send out a questionnaire to bring up to date the information on rectifiers which was obtained by last year's committee. (3) The committee will keep in touch with all phases of the situation, putting special emphasis on new developments in design or operation.

Considerable time was devoted to the preparation of certain definitions of rectifier terms to be used in this work and in the preparation of its report. The committee agreed to include in this year's report another list of all rectifier installations.

Those who attended the meeting were H. W. Codding, chairman; C. E. Baker representing F. W. Peters, C. A. Butcher, C. L. Doub, W. S. Richhart and G. C. Hecker.

Accountants' Executive Committee Meets

TWO reports, one by Leslie Vickers, on the status of the depreciation hearing in progress in Washington, and the other by the association's representative at the recent Railroad and Utilities Commissioners' convention, were made at the Nov. 18 meeting of the Accountants' executive committee meeting, held at Pittsburgh, Pa.

The committee voted to invite J. H. Hanna, chairman committee on national relations, and Dr. Thomas Conway, Jr., chairman sub-committee on depreciation, to become members of the committee on standard classification of accounts, and announced the personnel of the joint committee on engineering accounting, as follows: L. T. Hixson, chairman; F. A. Healy, T. P. Kilfoyle, C. R. Mahan and Walter Shroyer.

Those present at the meeting were T. B. MacRae, president; J. E. Heberle, C. R. Mahan, E. A. Tuson, L. T. Hixson, J. W. Welsh, M. W. Glover and Leslie Vickers.

Way and Structures

LAYING out and planning work for the coming year constituted the principal business of the way and structures committee at a meeting held at association headquarters, New York City, Dec. 8. Those present were: H. H. George, chairman; C. A. Alden, C. W. Burke, C. H. Clark, W. R. Dunham, Jr., E. D. Eckroad, E. B. Entwisle, C. F. Gailor, W. G. Hulbert, Adrian Hughes, Jr., E. M. T. Ryder, C. A. Smith, A. T. Spencer and H. M. Steward.

In considering the specifications and standards now included in the Engineering Manual, the committee called attention of the chairman of special committee No. 1 to the advisability of considering advancing the classification of some of the specifications to that of standard.

Special committee No. 2 on trackwork held a meeting and decided on crossing designs for steam over electric railways. It was recommended that these be approved by letter ballot.

News of Other Associations

A.I.E.E. Nominations Announced

NOMINATIONS for the general officers of the American Institute of Electrical Engineers have been made by the national nominating committee. Election will be by letter ballot and the results will be announced at the annual meeting. The officers so elected will go into office on Aug. 1, 1928. The nominations follow:

For president, R. F. Schuchardt, electrical engineer Commonwealth Edison Company, Chicago, Ill.

For vice-presidents:

Northeastern district, E. B. Merriam. Schenectady, N. Y.

New York City district, H. A. Kidder, New York, N. Y.

Great Lakes district, W. T. Ryan, Minneapolis, Minn.

Southwestern district, B. D. Hull, Dallas, Texas.

Northwestern district, G. E. Quinan, Seattle, Wash.

For managers: A. E. Bettis, Kansas City, Mo.; J. A. Johnson, Niagara Falls, N. Y., and A. M. MacCutcheon, Cleveland, Ohio.

For treasurer: George A. Hamilton, Elizabeth, N. J.

News of the Industry

Authority for Subway Routes in Chicago Settled

As a result of the settlement of all differences between the City Council of Chicago, Ill., and the Board of Local Improvements in the question of authority in determining the location of the tubes, a matter which has delayed action for several weeks on the subway bill, the fifth and last of the railway enabling bill, this measure was approved Dec. 8 and copies of the bill forwarded to the companies. At a joint meeting at which Mayor Thompson, Assistant Corporation Counsel Breen and the two contending groups were present it was agreed that the Aldermen would have the power to decide on the routes of the proposed subway system, while authority over engineering plans and actual construction would be given to Michael J. Faherty, president of the local improvement board. A bill transferring to the City Council the right of location now vested in Mr. Faherty's organization is consequently being drafted by the corporation counsel. The Aldermen also voted to draft a supplementary bill providing for twenty-year special assessment bonds to finance the subway system instead of the five-year bonds now permitted by law, which would impose too great a burden upon property owners.

Fare Changes on Lines in Southern Michigan

During the year just drawing to a close a number of changes were made in the fare schedules of the Michigan Electric Railway Company and its subsidiary, the Southern Michigan Transportation Company, and the Michigan Railroad and its subsidiary, the Rapid Transportation Company.

In January, 1927, the rate of city fares in Lansing, Jackson and Battle Creek was 10 cents cash, four tokens for 25 cents; children's fare between the ages of five and twelve years, 5 cents with universal transfers. On the sixteen buses operated in Lansing the fare was 10 cents cash; children's fare between the ages of five and twelve years, 5 cents with universal transfers. In Kalamazoo the fare was 8 cents cash, four tokens for 25 cents; children between the ages of five and twelve years, 5 cents on cars and buses, with universal transfers.

Since then the management has induced the city officials in the cities just named to change these rates to 10 cents cash, three tokens for 25 cents, children between the ages of five and twelve years 5 cents, with universal transfers. These fares are the same on cars and buses.

The rate of fare on the Southern Michigan Transportation Company buses operating between Jackson, Battle Creek and Kalamazoo and between Jackson and Lansing was 3 cents per mile in January, 1927, but has been increased to 3½ cents per mile. No change was made in the rate of fare on the interurban cars operating between the stations just named, that rate remaining at 3 cents per mile.

The rate of fare on the Rapid Transportation Company buses operating between Kalamazoo and Grand Rapids and between Bay City, Saginaw and Flint, in January, 1927, was 3 cents per mile and has been increased to 3½ cents per mile. The fare on the interurban cars of the company operating between those points remains the same as before, 3 cents per mile.

The increase in fare on the interurban buses was brought about by filing tariffs with the Michigan Public Utilities Commission. An interesting sidelight is that the changes were received graciously by both the company's patrons and the newspapers.

The Denver Decision

Review of controversy now ended with ruling favorable to railway's contention for perpetual rights

UPHOLDING the federal district court, the U. S. Circuit Court of Appeals, as noted briefly in the ELECTRIC RAILWAY JOURNAL for Dec. 17, page 1127, handed down a decision in St. Louis on Dec. 8, declaring, in substance, the Denver Tramway's franchise perpetual. The ruling made final a district court decision restraining the city from enforcing its 6-cent fare ordinance. Circuit Judge Booth said:

> We agree with the conclusions that in neither the constitution of Colorado nor the statutes, nor the charter of the city of Denver, are to be found any provisions prohibiting grants without time limit.

The opinion failed to support only one minor finding of the lower court when it ruled that the value of the franchise grant under 1885 and 1888 ordinances is not essential to the questions at issue. The federal district court fixed the value of this franchise grant at $2,000,000. The high court said:

> We see no important reason for its inclusion in the decree, and since the city contends it is prejudicially affected by the finding and has objected to the inclusion of the findings in the decree, we think it should be eliminated. In other respects the decree is approved.

Thomas H. Gibson, attorney for the city, would not say definitely what the attitude of his office will be, but it was considered unlikely the city will try an appeal to the U. S. Supreme Court, inasmuch as this court refused to take jurisdiction last January.

The litigation just concluded began during the time of the World War, with the effort of the Denver Tramway to obtain a higher fare than the 5-cent one allowed in the 1906 franchise.

In 1918, the company appealed to the State Public Utilities Commission for permission to increase its fare. Shortly thereafter the commission granted the Tramway a 7-cent fare, but then the Supreme Court handed down its famous telephone case decision, holding that Denver is a home rule city and that, as such, the Public Utilities Commission had no authority over it.

At the company's request, the City Council then passed an ordinance granting the Tramway a 6-cent fare. About this time Dewey C. Bailey waged his campaign for election on a promise to restore the 5-cent fare. Following his election, the 6-cent fare ordinance was repealed, but the Tramway insisted a 5-cent rate was confiscatory and another ordinance was passed permitting the company to charge 6 cents.

The litigation then was carried into the federal court, where Judge Robert E. Lewis, then a federal district judge, granted the company its present 8-cent cash rate with two tickets for 15 cents. This award was carried to the Circuit Court of Appeals and upheld.

Judge Lewis made permanent an injunction restraining the city from enforcing its 5-cent fare demands, and this decision also was upheld by the high court.

The city and the company then began a long controversy over the valuation of the tramway, seeking to establish a basis on which return on investment might be figured. Henry A. Dubbs was appointed special master in chancery to set a valuation. Delos F. Wilcox was employed as the city's valuation expert and A. L. Drum as an expert for the company.

The company claimed valuation of $33,000,000, Mr. Wilcox contended for a valuation of $11,000,000, and Mr. Dubbs placed the valuation at $20,105,707, in October, 1923.

Attorneys for the tramway, appealed Mr. Dubbs' valuation to the federal court, and Judge Lewis, on Dec. 13, 1923, increased the figure to $23,514,769. At this time Judge Lewis decided the tramway franchise was perpetual, based on the grants of 1886 and 1888, but he

held that the 5-cent fare provision was not binding.

When Henry E. May became city attorney, he appealed to the U. S. Supreme Court, contending that if the company had a perpetual franchise, the 5-cent fare provision also must stand. Last January, the high court ruled it had no jurisdiction in the matter, and the case was sent to the Circuit Court of Appeals, with which Mr. May filed briefs April 20, 1927.

The decision rendered on Dec. 8 was a rejection of the city's contention as carried in Mr. May's brief.

As things now stand the company would appear to be entitled to earn a return of 7½ per cent on a valuation of about $21,000,000. The present return is approximately 3.9 per cent, reports show, while patronage of tram lines has shown a steady decrease for several years. The problem before the directors, who are scheduled to meet in regular session on Dec. 29, will be to consider a fare which will provide a proper return without becoming too great to cut further into patronage. Figures made public recently, showed a drop of 6,000,000 fares in three years.

An Advertisement Tells of Progress

In announcing its plan to control taxicab cruising in Philadelphia, Pa., to which reference was made in the JOURNAL for Dec. 10, page 1080, the Philadelphia Rapid Transit Company recently ran advertisements in the daily papers of the city telling of the further steps which have been taken "in the interest of the 80 per cent" with the establishment of cab stands at nearly every street car stop in the business district. The company, owner of the Yellow Cab Company, expresses its belief that the new plan will assist in speeding up traffic for everybody and make Yellow Cab service more accessible than before. In its advertisement the company recognizes the slight change in the taxicab habits of the cab riders who will go to the nearest car stop for a cab instead of hailing one on the street. The co-operation of all is sought in an effort to make the new plan a success—"to speed up traffic for the 80 per cent."

Downtown Parking in Oklahoma City Prohibited

The Oklahoma City, Okla., City Council has adopted an emergency ordinance abolishing double parking of automobiles in the downtown district. Cars unable to park at the curb may stop only long enough to discharge or take on passengers. It is believed that this will stimulate use of the electric railway cars, which, while not the purpose of the City Council, would be gratifying to many citizens, who consider the Oklahoma Railway essential to the proper movement of traffic of the city and are anxious to see the local railway property restored fully to its former prosperous condition.

Several months ago this property passed into the hands of local investors.

Safety Zone Stop Ruling in Minneapolis

A traffic ordinance effective Dec. 6 in Minneapolis, Minn., gives a definite limit to street car stop safety zones of a strip 4 ft. wide adjacent and parallel to the tracks, as long as the longest street car or street car and trailer. Except where there are safety zones, drivers of automotives must come to a full stop at least 10 ft. behind the street car until gates are closed. Drivers may pass at a reasonable speed to the right of safety zones, but never through them. Drivers may never pass a street car moving in the same direction to its left except where there is a one-way street.

Hearing on New York Labor Injunction Plea Jan. 23

Supreme Court Justice Wasservogel announced on Dec. 16, after a conference with the attorneys, that the hearing of the injunction suit by the Interborough Rapid Transit Company against the American Federation of Labor and its officers to restrain them from attempting to organize the Interborough employees, has been postponed from Dec. 21 to Jan. 23.

The adjournment was taken, it was said, because the papers in the case are so voluminous that more time will be needed for preparation before arguments are heard. Counsel for the labor organization will have until Dec. 24 to file answering affidavits, and counsel for the Transit company until Jan. 5 to file theirs.

Profitable Investment in Display Signs in Atlanta

A device that has proved a great convenience to car patrons of the Georgia Power Company was recently put in use by the new Jacobs Pharmacy at Peachtree and Ellis Street, Atlanta, Ga. A large display board has been placed at the rear of the store where it can be seen by all customers. Whenever a street car approaches the fact is signaled on the board with the information whether the car is bound north or south. It is operated by a colored porter who stands outside the store and presses a button when he sees a car coming from either direction, but it has made the store a rendezvous for all passengers on this particular line.

Patrons do not have to wait in the rain watching for a car, nor do they have to run to the door every two or three minutes to see if a car is coming. The signal gives them plenty of warning and tells them what car is coming. This system, it is said, has brought in many new customers to the drug store.

Questions $7,000,000 Items in Interborough Accounting

New York City's Transit Commission, in demanding that the Interborough Rapid Transit Company amend its accounts covering subway operating contracts with the city, questions the propriety of certain items charged to the cost of operating the subway. Chairman Gilchrist notified the company that the commission has questioned items totaling more than $7,000,000 in its accounting and asked the company to inform the commission whether or not the company will refrain from collecting anything more on the accrued preferentials of about $4,800,000, pending settlement of the accounting items in dispute. The commission contends that the accrued preferentials will be wiped out by the adjustment of these controversial items.

President Hedley of the company said:

The contract between the city and the company provides that the commission may object to any expenditure as unreasonable or improper, whereupon the amount is held in a suspense account until the item in dispute is adjudicated by arbitration. If the determination of the arbitrators is that the expenditure is reasonable and proper, the amount must be charged against the proper account; otherwise the amount, with interest, must be borne by the Interborough and deducted from the accumulated deficits.

The Interborough does not concede that any item in its charges for expenses has not been actually and necessarily incurred in the operation of the subway. Differences of opinion might naturally arise as to whether certain expenditures should be charged to operation or to the company. For illustration: The expenses of the consulting engineers for their examinations in connection with the readjustment of the Manhattan Elevated rental some years ago are debatable either way. It is for just such items that arbitration is provided. It is not expected that any board of arbitrators will sustain the contention now advanced by the commission to anything approaching the amount recently claimed in conference, and which is set forth in the letter I have received.

As the matter presently will be submitted to a fair and impartial tribunal for determination, it will be advisable to reserve discussion of details until a hearing before the arbitrators.

Another Ticket Privilege in Alliance

The week-end pass, good for unlimited rides over the entire division of the Stark Electric Railway, Alliance, Ohio, on Saturday and Sunday is being issued in an effort to stimulate week-end business, including Saturday night trips to nearby cities for shopping and shows, and for week-end visits. According to E. W. Sweezy, general manager, the new pass will be sold for $1. It will be good over the entire system of 35 miles.

With this addition, the "ticket family" on the Stark Electric now has twelve members, including nine weekly passes, the Sunday, daily system and week-end permits.

President Shannahan Outlines His Policy for Omaha

John N. Shannahan, the new president of the Omaha & Council Bluffs Street Railway, Omaha, Neb., has assumed the duties of his position. In a statement to the press he said that the problem in Omaha appeared to be no different than it was in other cities he cited, where intensive application of modern methods has restored companies financially. His first word to the people of Omaha was that the company is the servant of the public, and he would endeavor to have it so regarded by them. The company, he says, wants the Omaha public to ride the street cars. His efforts will be directed toward supplying service that would bring this about.

Lower Fare to Atlanta University

The Public Service Commission's order for new fares in Atlanta, Ga., on the lines of the Georgia Power Company has been revised so as to bring about a reduced rate between Atlanta and Oglethorpe University. In the order affecting the Oglethorpe University line the old fare of 13 cents, with privilege of transfer, will be replaced by a 10-cent fare without the privilege of transferring to another line. If a transfer is desired tickets will cost 13½ cents, while cash fares will be 16 cents. The old fare of 6 cents from Buckhead to Oglethorpe will not be increased, as was provided for in the original order of the commission.

Gary Operators Join Classes

Twenty-three operators, trainmen and linemen of the Gary Railways, Gary, Ind., have enrolled for the course in elementary electricity, which is being given free to employees by the company. Classes will be conducted in the Public Service Building every Tuesday night by Howard Ayers, member of the staff of instructors in electrical engineering of Purdue University.

Subway Budget Item Disallowed in New York

The decision of Supreme Court Justice Wasservogel, directing the Board of Estimate of New York City to eliminate from the 1928 budget the item of $13,000,000 for amortization of one-fourth of a proposed issue of $52,000,000 of four-year subway construction bonds, was affirmed unanimously on Dec. 16 by the Appellate Division. The decision not only declared that the $13,000,000 item had been placed unlawfully in the budget, but sustained the Citizens Union's contention that the certificate of the Controller as to the necessity of the appropriation was necessary.

The Appellate Division's decision is the second set-back for Mayor Walker and the majority of the Board of Estimate in their efforts to put through the plan of financing subway construction proposed by John H. Delaney, chairman of the Board of Transportation, and reduce the overhead on the cost of the city's new subways, sufficiently to permit the city to maintain the 5-cent fare on the lines which it is intended the city shall operate.

So the Shippers Might Understand

Completion of enlargement of Columbus freight terminal turned to advantage by railways to tell story to shippers General discussion at dinner

THE completion of the enlargement of the Columbus freight terminal was the occasion for an inspection and "get-together" party at Columbus, Ohio, on Oct. 27, attended by traffic representatives of the most of the electric railway properties of Ohio, Indiana and Michigan, shippers of Columbus, Ohio, representatives of civic organizations in Columbus and officials of the Indiana, Columbus & Eastern Traction Company, who sponsored the party.

During the summer additions were made to the freight house and yards, consisting of an extension to the freight house, 41 ft. wide and approximately 65 ft. long, which increased the floor space 65 per cent and door capacity 70 per cent. The yard capacity was increased to accommodate 30 cars.

The effect of these changes was immediately noticeable. Overnight service traffic between Columbus and Springfield, Cincinnati, Dayton, Fort Wayne, Detroit, Cleveland and many intermediate points began to pick up. Unsolicited reports from shippers indicated that they were highly pleased with the new service. Complaints from the connecting lines, regarding congestion, at this point, were no longer received.

The officials then decided that the achievement of the Columbus Interurban Terminal Company (the holding company of traction terminals in Columbus) should be fittingly celebrated. A "get-together" meeting and inspection party was planned and letters of invitation were sent to traffic and managing officials of connecting Ohio, Indiana, and Michigan lines, shippers and representatives of civic organizations in Columbus. Later, illustrated invitations were mailed giving the complete program for Oct. 27.

The meeting during the day was presided over by W. R. Huffer, traffic manager of the Indianapolis, Columbus & Eastern Traction Company, who also conducted the tour of inspection through the freight terminal and yards. Following the luncheon at noon the guests were taken for a tour of the capital in special buses of the Dayton & Columbus Transportation Company, a subsidiary of Indiana, Columbus & Eastern Company. The new O'Shaughnessy Dam, Ohio State University grounds and commercial districts were viewed, and the tour ended at the Elks Country Club.

At 6 o'clock dinner was served at the Country Club, and, acting as toastmaster of the occasion, J. M. Pogue, general manager of the Indiana, Columbus & Eastern Company, endeavored to sponsor the "get-together" spirit which was prevalent in the meeting and stressed the various freight activities of interurban lines in the territory. Emphasis was laid upon the fact that the lines were being called upon to furnish considerable freight equipment for handling carload business, particularly cement, as two large plants are located at Osborn, Ohio, viz., the Southwestern Portland Cement Company and the Wabash Portland Cement Company.

The meeting was turned into a round-table discussion and compliments from the Columbus shippers and Chamber of Commerce officials regarding the service of the electric lines were enthusiatically received by the guests. Expressions of the Columbus shippers were to the effect that fast and efficient service, as had been built up by the electric lines, would continue to build up the electric freight business and the consensus of opinion seemed to be that many shippers were sending every possible pound of freight via the electric lines.

Various traffic officials had an opportunity to state their problems and to outline what their individual properties were planning for the coming year in the fields of solicitation, advertising and improved operating facilities. Discussion centered on the thought of greater co-operation and improved service, during the coming year as affecting the interurban properties and the shippers of the Central electric territory.

The concensus of opinion is that the groundwork was laid at this meeting for further co-operation with all electric lines in the territory. That was the desire in the first instance, and the belief exists that the gathering was more than partially successful in this respect.

Another Move in Des Moines One-Man Car Case

The Des Moines City Railway, Des Moines, Iowa, lost its final attempt to break loose from compulsory two-man car operation when the Iowa Supreme Court on Dec. 17 refused the company a rehearing in its case against the street car men's union.

The high court had previously upheld the Polk County District Court in ruling that the 25-year agreement between the union and the company making two-man car service obligatory is bind-

ing in all of its features. The agreement was signed in 1915.

However, in spite of the Iowa Supreme Court's refusal to reopen the case, the decision of Dec. 17 is felt to have but little actual bearing on the situation as it exists now. The Des Moines City Railway has been in receivership since Nov. 11, this year, and Federal District Judge Martin J. Wade has empowered the receivers to terminate any contract affecting operations which involves either labor or materials.

So far the receivers have given no inkling as to whether they will institute one-man cars. However, F. C. Chambers, operating receiver and president of the company, has stated repeatedly that the company could save from $250,000 to $300,000 annually by substituting service with one-man cars. With the company facing an operating deficit of $129,000 for 1927, it is generally agreed that nothing short of one-man cars will save the day.

More Facts in Galveston Fare Case

Additional data in connection with the application of the Galveston Electric Company, Galveston, Tex., for an adjustment in car fares have been presented to the City Council by R. G. Carroll, general manager. The board was asked to consider the value of property used for transportation purposes "upon which we are entitled to earn a fair return." The company declared that the actual cost of property used to furnish railway service in Galveston was $2,170,718 on July 31, 1927, and that since that time $88,000 in capital expenditures had been made for railway purposes, including $65,000 for new cars.

Some weeks ago the company asked for an increase in fares on the basis of four tokens for 30 cents, a straight 10-cent fare or the purchase by the rider of a 25-cent weekly ticket, the holder of which would ride each time for an additional 5 cents. This compares with the present fare of 6 cents.

Improvements to Be Made by Reading Transit

A contribution of $43,666 toward the cost of eliminating a grade crossing in the Borough of Bridgeport, Pa., has been demanded of the Reading Transit Company by the Pennsylvania Public Service Commission. A major portion of the money to be paid by the railway will be for the reconstruction of its tracks made necessary because of the improvement.

The commission directs the company to pay $37,161 for these track relocations in the borough. The railway also must pay $5,000 toward the cost of building the new bridge which will eliminate the grade crossing. The company also is to contribute 1 per cent toward the cost of taking property for the improvement. These property damages are estimated at more than $150,000 which will make the company's share about $1,505 for that item. A crossing over four tracks of the Reading Company is to be abolished by the construction of a bridge. The estimated cost of the work is $258,872, of which amount the electric railway will contribute more than $42,000. The property damages are additional to the other costs.

Isn't That the Truth?

THERE is nothing sacred about a nickel in the street car business; there is nothing, either, that would definitely fix 10 cents as the limit. Those who ride the car lines will have to pay what it costs. Chase the matter through arguing between company and Council, chase the issue through the courts, chase it anywhere you please, and, in the end, that is what it will amount to. If railway service functions, it must be paid for. That part of the matter is inescapable.

—Lansing Journal.

New Uniforms for Safe Records in Memphis

Approximately 100 trainmen of the Memphis Street Railway, Memphis, Tenn., will be presented with new uniforms and caps as Christmas gifts by the management. Their records disclose no accident which cost the company money within the past year. A. D. McWhorter, general superintendent, said it was an expression of appreciation to 40 per cent of the trainmen who have had no accident, causing damage claims.

More Than 2,500 Boston Cars Replaced

The Boston Elevated Railway, Boston, Mass., owned, at the time the property was taken over by the public trustees in 1918, 3,372 surface cars, of which 1,354 were open cars, leaving 2,018 closed cars. At that time, the use of the open cars had been entirely abandoned and their value was negligible. The number of surface cars owned Dec. 31, 1926, was 1627, which was a shrinkage of 391 in the number of such cars owned in 1918. The book investment in both rapid transit and surface cars on July 1, 1918, was $17,427,000, as against a book investment in 1926 of $24,628,000. This increase was provided for by the proceeds of the issue of securities and by the depreciation reserve, or by proceeds from the sale of the Cambridge subway. Of the original surface cars owned in 1918 there remained only 842 on Dec. 31, 1926.—*From statement of committee reporting on Boston Elevated.*

St. Louis Company Meets Patrons "On the Air"

To popularize its service with the inhabitants of St. Louis and vicinity the St. Louis Public Service Company, new owners of the street railway system in St. Louis, Mo., has taken to the air. The company has engaged prominent quartets of St. Louis to give programs via Radio Station KMOX, the "Voice of St. Louis."

In the initial hour of the St. Louis Public Service Company air career the Pilgrim Quartet featured Christmas carols and other songs suitable to the holiday season.

William E. McCoy Has Enviable Record

To commemorate his 35-year service record William E. McCoy, veteran street car motorman of the Roanoke Railway & Electric Company, Roanoke, Va., was presented a service pin at a recent meeting of the employees. The pin is studed with seven diamonds, one for each five years of his time with the company.

Since early in 1894 Mr. McCoy has been running on the Salem line and in the intervening years has become well known to thousands of patrons. Offered opportunities for advancement, he passed them by satisfied with the genuine pleasure he found in the train service.

In commenting on his experiences the Roanoke *Times* says that Mr. McCoy has profited by what has crossed his vision.

Curtis Bay to Be Tapped by Washington-Baltimore Line

The Washington, Baltimore & Annapolis Electric Railroad has decided to build a branch line into the Curtis Bay District near Baltimore. Rights of way have been acquired by the company and the Public Service Commission may soon be asked to approve construction of the line. The branch probably will run from Shipley Station, on the main line, to the junction of Cabin and Curtis creeks.

Belt Line Project in Oklahoma City Awaited

With the termination of the receivership of the Oklahoma Railway, Oklahoma City, Okla., efforts will be made at once to build a belt line, a project which met with much opposition when

first proposed. Arrangements for financing the belt line were completed recently by Hubert R. Hudson. At the time, Mr. Hudson arranged to meet almost $1,000,000 in junior mortgage bonds which are due Jan. 1, 1928.

One-Man Cars to Continue on Stark Electric

The state ban against one-man cars on the Stark Electric Railroad, Alliance, Ohio, has been lifted. General Manager E. W. Sweezy, appearing before the Ohio Public Utilities Commission at Columbus, was assured that the state citation, received a short time after two interurban cars had crashed near Sebring, would be indefinitely deferred.

Appearing before the officials with records of one- and two-man operation, covering a period of twelve years, Mr. Sweezy gave his reasons why the company should not be compelled to discontinue one-man operation until a block system had been installed. The figures showed that under two-man operation an accident was recorded every 530,000 miles, while with one-man operation there has been only one wreck in approximately 1,250,000 miles.

While the state department has not ordered the installation of a block signal system, this is being planned for the near future, according to Mr. Sweezy. Next summer, it is believed, business on the line will warrant the additional cost for installation over part of the division.

Strike Continues on Schuylkill Railway

No report of material progress in the status of the Schuylkill Railway strike emanates from that territory. On Dec. 9 a conference was held in Philadelphia between the receivers and representatives of the men through M. A. Kilker, a lawyer of Girardville, Pa., who made an earnest plea for settlement. These efforts so far have proved unavailing, though Mr. Kilker is still endeavoring to promote this purpose.

The differences between the receivers and the men relating to the wage scale were satisfactorily adjusted, but the men, at a subsequent meeting, rejected the offer as a whole because the receivers found themselves unprepared and unable to extend the agreement with the railway men to include bus men of a separate corporate organization over whom they had no control or influence.

California Franchises Granted

The City Council of Richmond, Cal., has passed the ordinances of the Key System Transit Company authorizing three new franchises for the local lines in Richmond. These 50-year grants are effective on a new basis which relieves the company of much of the burden of paving its right-of-way and of track reconstruction.

Safety Bonuses Awarded to Brooklyn Operators

Safety bonuses aggregating $125,060 were awarded last week by the Brooklyn City Railroad and the Brooklyn-Manhattan Transit, Brooklyn, N. Y., to their employees who had a record for no "at fault" accidents in operating surface cars. The former distributed $71,000 and the latter $54,060.

On behalf of the Brooklyn City Railroad, Borough President Byrne, in his reception room at Borough Hall, on Dec. 16 presented to each of 28 motormen, conductors and safety car operators of the company a gold watch suitably engraved. The company awarded the watches to those employees who had operated cars for the twelve months ended Nov. 30, 1927, without an accident. The watches were presented in addition to the regular $60 safety bonuses which each man earned.

Mr. Byrne, after commending the men for their work in reducing accidents on city streets, handed to each employee a watch on which was engraved "Presented to ——— by Borough President James J. Byrne for Brooklyn City Railroad, Dec. 16, 1927, in appreciation of an excellent safety record Dec. 1, 1926, to Nov. 30, 1927." Those who received the watches were:

John Boyce, Vincenzo Cincotta, Lawrence G. Day, John Dinnean, William Esperstedt, Christian Frohlich, T. J. Fallon, Michael Hamil, W. J. Hammill, C. F. Heynen, J. Juggenheimer, M. J. Kowalinski, Patrick Keane, Patrick Kilday, Michael J. Killeen, Patrick McGuiness, James J. Martin, James J. O'Keefe, Stanislaw Olszewski, Frank Reahl, Mathew J. Reilly, John Rothenhousen, Jacob H. Schultz, Anton Schock, Henry W. Schult, Frank M. Smith, Adolph Seebeck, Frank J. Weiss.

The award of safety bonus checks is an annual feature of the Brooklyn City Railroad's campaign to reduce accidents on its transit lines. All motormen, conductors and safety car operators are credited with $5 for each 30 days operation without accident during the period from Dec. 1 to the following Nov. 30.

Clinton E. Morgan, vice-president and general manager of the railroad, states that of the 2,180 car operators of the company 91 per cent received checks this year in amounts varying from $60 to $5. The total amount of the bonus, for 1927, $71,000, was earned by the men in reducing all accidents for the year ended Nov. 30, 1927, over the preceding twelve months by 12 per cent. The 1,987 men who received awards this year worked 428,820 days without an "at fault" accident. Officials of the company computed that the 28 car operators who received the gold watches had carried 7,819,000 passengers and operated their cars more than 752,000 car-miles without an accident.

Bonuses aggregating $54,060 on Dec. 16 were in the hands of 1,892 motormen and conductors of the B.-M. T. surface lines as a reward for operating their cars for one or more periods of 30 days without accidents for which they were at fault.

The bonuses were awarded as a result of the accident prevention bonus plan put into effect on the B.-M. T. surface lines on Feb. 1, 1927, and were earned during the ten months ended Dec. 1, 1927. The individual bonuses ranged from $55 to $5 and averaged nearly $30 to each of the 1,892 car men who qualified for bonuses under the plan.



Photo by Underwood & Underwood

Brooklyn surface trainmen receiving awards for safety, with Borough President Byrne officiating

Of the $54,060 total, $2,425 was distributed as special bonuses to 485 motormen and conductors who in the period from Feb. 1 to Dec. 1 had operated their cars for at least 180 consecutive working days without an accident for which they could be held responsible. The records showed that 130 motormen and conductors had maintained absolutely clear records so far as chargeable accidents were concerned during the entire ten-month period.

Efforts—and success—in reducing accidents were not confined to the veteran car men, however. This fact is established from the records, which show that 1,892 out of a total 2,131 men at the various B.-M. T. depots operated for one or more periods of 30 consecutive working days without an "at fault" accident. These 1,892 men together operated their cars for 310,000 working days without being responsible for a single accident.

Rehearing on Oakland Fare Request

A rehearing has been granted the Key System Transit Company of Oakland by the California Railroad Commission on the 5-cent zone fare order which was halted by the company's protest. Commissioner Clyde Seavey will preside at the rehearing, set for Jan. 24 in the City Hall at Oakland.

The company seeks to have its own plan substituted for the zone plan. It has asked a raise in transient street car fares from 7 to 10 cents and in ferry fares from 21 to 25 cents. The company also seeks permission to sell weekly passes to regular riders for $1 over territory now included in the 7-cent fare zone and for $1.50 weekly over entire traction system. Monthly passes good on Key System cars, trains and boats would cost $10.

The commission's order for a 5-cent zone or basic fare and 20 cents on ferries was attacked as confiscatary in the company's formal protest.

No Parking Law Effective in Chicago Loop Jan. 2

Parking of automobiles in the Chicago Loop district will be abolished for a trial period of three months beginning Jan. 2 under the terms of an ordinance passed by the City Council on Dec. 14 by a vote of 37 to 4. It is expected it will be signed by Mayor Thompson. Prohibition against parking has been urged by civic bodies and traffic experts for many months as the only effective means of expediting street traffic in one of the most heavily congested districts of its size in the world. The ordinance, which has been approved by the Chicago Association of Commerce, embodies many of the recommendations made by Miller Clintock of Harvard University, in the traffic survey he completed last year.

The new rule will be in effect from 7 a.m. to 6:30 p.m. except Saturdays, Sundays and holidays. On Saturdays it will be enforced only until 3 p.m. All restrictions will be lifted on Sundays and on certain national holidays. This ban will not affect stops made by vehicles to discharge or pick up passengers. Taxicab stands established by ordinance will also be entitled to their quota of cars awaiting fares. Ambulances, fire trucks and public utility company vehicles operated for emergency purposes will likewise be exempted from the ban. Penalties for violation of the ordinance are fixed at from $1 to $25 for each offense. If, after a few months' time, the restriction should be popularly regarded as a failure, the City Council indicated that the law would be repealed.

Among the objections cited to the ban—many of which were heard in previous public meetings on the question—was that it would bring more taxicabs on the street and discriminate in favor of the automobile owner employing his own chauffeur. Several downtown merchants and hotel proprietors testified at the hearings that it would drive away business from their doors. Proponents of the law held that it would speed up traffic and help business by making the downtown streets more passable for shoppers.

Utility Inquiry Authorized

Senator Walsh (Democrat) of Montana, on Dec. 17 introduced a resolution proposing an inquiry into the financing and control of public utilities companies throughout the country and into any attempts which may have been made by the companies to carry on propaganda to influence public opinion with respect to the ownership of sources of power, or the generation or distribution of power.

The investigation proposed, under the terms of the Walsh resolution, would be carried on by a special committee of five Senators.

Senator Walsh asked that his resolution be referred to the committee to audit and control contingent expense. Senator Moses (Rep.) of New Hampshire asked first if Senator Walsh would be satisfied to have the resolution referred to the committee on interstate commerce and when the latter said he saw no reason for such a reference, Senator Moses then asked that the resolution lie over for future consideration.

On Dec. 19 the Senate by a vote of 40 to 36, decided to refer the Walsh resolution to the committee on interstate commerce. On the vote to send the resolution to the latter committee thirteen Democrats joined with 27 Republicans in opposition to the course of action sought by the Montana Senator. On the other side eleven Republicans voted with 24 Democrats and Senator Shipstead (Farmer-Labor), Minnesota, in opposition to the motion of Senator Moses.

The resolution differs from the one introduced by Senator Walsh in the last Congress, in that several new clauses have been added, the most important being that embodied in the second paragraph concerning publicity and political activities of utility companies, which is entirely new.

Consideration of the matter by the committee will begin on Jan. 16.

Harvard Advertising Awards to Be Announced in January

The jury of the Harvard Advertising Awards, including prominent advertising men of agencies, publications, industry and educational institutions, will meet the middle of January to award the prizes for outstanding advertising material of the year, 1927.

These awards are:

1. Four prizes of $2,000 each for the campaigns most conspicuous for the excellence of planning and execution, seeking publicity on a national scale, seeking publicity for industrial products primarily through trade journals, seeking publicity in a local area, and for the campaign executed locally in cities of 100,000 population or less.

2. Four prizes of $1,000 each for the advertisement most effective in its use of text, for the advertisement most effective in its use of pictorial illustration, for the advertisement most effective in its combination of text and illustration, and for the advertisement most effective in typography.

3. A prize of $2,000 for the advertising research of the year most conspicuous either because it has brought about economy or secured efficiency in advertising by producing information of general value in furthering the science of advertising, or because it has reduced or precluded unwise or wasteful expenditure in a specific advertising program.

4. A gold medal, awarded to the individual or organization deemed by the jury to merit recognition for distinguished contemporary services to advertising.

Advertising material to be eligible for this year's competition must be submitted to the Harvard Advertising Awards, Harvard Business School, Soldiers Field Station, Boston, Mass., not later than Dec. 31, 1927.

The Harvard Advertising Awards, were founded in 1923 by Edward W. Bok.

Outline of Public Utility Economics

By Martin G. Glaeser. New York: Macmillan Company, 1927. 847 pages. Price, $4.25.

This is one of the series of social science text books edited by Dr. Richard T. Ely, who has written an introduction to the book. He believes that future writers will refer to the volume as beginning the scientific treatment of public utilities.

The author is professor of economics at the University of Wisconsin and Research Associate of the Institute for Research in Land Economics and Public Utilities. He also brings to his task the benefit of long experience as statistician and case investigator for the Wisconsin Railroad Commission. The book is divided into four parts, as follows:. The economic basis of public utility enterprises, the development of agencies of regulation in the United States, the administration of public utilities under regulation, and trends in public policies affecting utilities. Throughout the book are many statistical charts and tables, which help to illuminate the text. In his discussion of valuation of utilities, the author tends toward the investment method, and recommends a variation in the rate of return according to current interest rates. The appendix includes a proposed service-at-cost franchise, drafted for Milwaukee by a joint aldermanic and citizens' committee for which Professor Glaeser acted as adviser.

The volume should be most helpful to electric railways, the problems of which are considered extensively in "The Outline of Public Utility Economics."

Recent Bus Developments

Competition Between Kansas City and Independence Denied

The Missouri Public Service Commission decided on Dec. 16 that the privilege of a bus company to compete with the suburban street car lines of the Kansas City Public Service Company between Kansas City and Independence, Mo., should be denied. An application for a bus permit submitted by King Brothers to operate buses between Oak Grove and Kansas City was granted by the commission with the proviso that the company should refrain from picking up or discharging passengers between Independence and Kansas City on the grounds that the street railway company was already giving "excellent and frequent service" in that territory. The bus company will be permitted to receive and discharge fares between Oak Grove and Independence and carry such passengers to Kansas City. The buses will use United States Highway No. 40.

Consents for Newark-Paterson Buses Approved

Municipal consents to the Public Service Transportation Company, Newark, N. J., to operate eight de luxe auto buses on the Paterson-Newark route, by way of Bloomfield and Clifton, have been approved by the Public Utilities Commission. The testimony indicated the proposed route would afford a quicker service between Paterson and Newark. The rate of fare follows: Newark to Bloomfield, 25 cents; Newark to Clifton, 40; Newark to Paterson, 50 cents.

Program for Interstate Carriers Urged

The lack of federal legislation for control of bus operations in interstate traffic creates a problem of increasing importance with the expansion of the traffic, says the Interstate Commerce Commission in its annual report to Congress, recently issued. The full text of the statement made by the commission on this matter reads:

In our last report we referred to the investigation on our own motion into and concerning the general question of the operation of buses and trucks by, or in connection or competition with, common carriers subject to the interstate commerce act.

During the past year laws were enacted in four states providing for the regulation or control over common-carrier motor vehicles in 42 states and the District of Columbia. The rapidly increasing use of buses and trucks makes the absence of any regulatory control over those engaged in interstate commerce a problem of constantly increasing importance.

Statistical summaries of the answers of the respondent railways to questionnaires have been tabulated and made available to the public.

We deem it advisable that a proposed report be prepared by an examiner and served upon the parties to the proceedings, thus affording opportunity for the filing of exceptions thereto, to be followed by oral argument before us and report thereon to the Congress with our recommendations as speedily as may be consistent with the nature and importance of the subject.

Buses Must Remain Off Car Streets in Peru

An amendment to the bus law in Peru, Ind., recently passed by the City Council states that it will be unlawful for public service automobiles to operate on streets paralleled by street cars except where it is necessary for the drivers to make up their routes. The ordinance fixes a bond of $2,000 for each operator—or machine—having a carrying capacity of not more than five persons, and an additional sum of $250 for each person in excess of that number. The maximum bond for any bus will be $3,000 annually. All operators must make written application for licenses. The Indiana Service Corporation operates in Peru.

Dismisses Objections of Schuylkill Railway

The Superior Court dismissed the appeal of the Schuylkill Railway, Girardville, Pa., on Dec. 15 from the order of the Public Service Commission granting a certificate of public convenience to the Reading Transportation Company, which is to operate the bus lines in twenty-four counties of Pennsylvania. The Schuylkill Railway interests based their opposition on the fear of destructive competition. Judge Henderson said in an opinion that the objections "are premature, as nothing has yet been decided by the Public Service Commission save that on the evidence submitted the new corporation may be created."

Extensions in Connecticut

Bus service has been started by the Connecticut Company between Meriden and Middletown, Conn. The company still maintains service on its electric railway between Westfield and Meriden.

New Service by Bus in Gadsden

The Alabama Power Company, owner and operator of the electric railway at Gadsden, Ala., will take up the car tracks on Ewing Avenue, Gadsden, and substitute bus service. The power company is to pay $5,000 toward the cost of paving this thoroughfare.

Buses in Joplin Follow Cars

The Joplin & Pittsburg Railway has organized a bus line to supplant the cars on the Cunningham-Schifferdecker Park division in Joplin. For most of the way the buses follow the route of the railway.

New Line in Kansas City Promised

After more than two years of attempting to secure adequate transportation facilities for the vicinity of 43d Street, Kansas City, Mo., the residents of the neighborhood have at last secured the approval of the Kansas City Public Service Company and a bus line with ten-minute service for an eight-hour day will be installed. The Indiana Avenue stub line did not afford adequate transportation. Transfers will be given from buses to cars. The City Council has yet to pass upon the installation.

Larger Bus Proposed in Boston

The Boston Elevated Railway has decided to introduce into the service in Boston, Mass., a motor coach of a larger type than that now in use and is planning a 60-day experiment with two buses that resemble a modern trolley car, are 31 ft. long and seat 40 passengers. Longer cars are not permitted in Boston under the bus laws and the rules of the Public Utilities Department, but the Elevated is seeking a special 60-day exemption from those rules in the case of two trial cars. If the opportunity for an experiment is given the route used will be in a busy business section, and if it proves successful the company will buy larger buses in the future. No opposition to the plan has been encountered, but it may be necessary to secure an amendment of the bus laws of the state.

Buck vs. Kuykendall Quoted in Another Interstate Case

The Appellate Division of the New York Supreme Court for the Second Department has handed down a decision sustaining the right of the Journal Square Coach Transportation Company to operate a bus line between Journal Square, Jersey City, and the town of Nyack, in New York, without a license from the Town Board of Orangetown. It also reversed the order made by Justice Arthur S. Tompkins on Aug. 20, 1927, restraining the Journal Square Coach Transportation Company from continuing to operate a bus line over the public highways in the town of Orangetown until granted permission to do so by the Town Board of Orangetown.

The decision of the Appellate Division upholds the contention made in behalf of the Journal Square Coach Transportation Company that, since it was engaged only in interstate transportation, it was not required by law to secure

the consent of the Town Board of Orangetown for such interstate operation. This was in effect also the prior ruling made by the Public Service Commission. It overrules the contrary views advanced by the Town Board's attorney, E. W. Hofstatter, which the Town Board had followed in stopping the operation of the bus line.

The decision of the Appellate Division was unanimous.

By its decision, the Appellate Division reversed the temporary injunction order of Justice Tompkins and denied the original motion of the town of Orangetown for a temporary injunction. It held that the Journal Square Coach Transportation Company was not required to have either a license from the local authorities or a certificate of convenience and necessity from the Public Service Commission, but that the bus company was subject to impartial reasonable regulations by duly constituted authority. It also held that the action of the town of Orangetown in denying the company's application was arbitrary.

The opinion of the court, in full, is as follows:

364 N.E. Town of Orangetown, respondent vs. Journal Square Coach Transportation Cmpany, appellant.

Order reversed upon the law, with $10 costs and disbursements, and motion for injunction pendente lite denied, the $10 costs. The plaintiff arbitrarily denied the application of defendant for a license. No question of rules, regulations or tax free requirements were raised. The defendant, which is doing an exclusively interstate transportation business, is not required to have either license from local authorities or certificate of "convenience and necessity" from the Public Service Commission, and may operate subject to reasonable rules and regulations adopted, and payment of reasonable fees provided for, by duly constituted authority. (Buck vs. Kuykendall. 267 U.S. 307; Bush Co. vs. Maloy, 267 U.S. 317.) Rich, Young, Kapper, Lazansky, and Hagarty, JJ. concur.

Bus Substitution Suggested in Moorestown

The Public Service Railway, Newark, N. J., desires to abandon railway service from Camden to Moorestown and substitute buses. Before the Board of Public Utility Commissioners in Camden on Dec. 5 a railway representative said that if trolley service were continued it would be necessary to spend $200,000 for new tracks, that it was the purpose of the company to operate buses on a fifteen-minute headway along with service to Mount Holly by way of Burlington. At the suggestion of counsel for the community of Moorestown the case was continued so as to permit public sentiment to be sounded.

PERMIT GIVEN FOR BUS OPERATION.—The Wisconsin Motor Bus Lines has been granted a permit by the West Allis City Council to operate buses from Milwaukee to West Allis. This is the bus subsidiary of the Milwaukee Electric Railway & Light Company.

Financial *and* Corporate

United Gas Improvement Sells Stock of National Public Service

The United Gas Improvement Company has arranged to sell its minority interest in National Public Service Company B stock to E. H. Rollins & Sons and Howe, Snow & Company of New York.

These firms previously held about 15 per cent of the common B stock, no par value, which has exclusive voting power.

The sale of the B stock embraces 50,000 shares owned by the United Gas Improvement Company direct and 48,946 shares owned by Day & Zimmermann, Inc. The United Gas acquired its B stock when it purchased control of Day & Zimmermann, Inc.

The National Public Service Company is a holding company, which, through its subsidiaries in New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, Georgia and Florida, operates steam, electric railways and buses to 374 communities with a population of more than 2,000,000.

Suburban Line Merged With Milwaukee System

The Wisconsin Railroad Commission has approved the merger of the Milwaukee Northern Railway with the Milwaukee Electric Railway & Light Company. The Milwaukee Northern operates between Milwaukee and Sheboygan. City fares on the Northern line will be increased from 5 cents to 7 cents to conform with Milwaukee city fares. The Milwaukee Electric Railway & Light Company has long held the second preferred and the common stocks of the Milwaukee Northern Railway.

Last of Mesaba Railway Soon to Be Sold

With practically all of the company property and equipment sold, receivers for the defunct Mesaba Railway, Virginia, Minn., serving Mesaba Range communities, expects an early discharge of the receivership.

When the remaining property and the other equipment are disposed of, it is estimated that the gross salvage return on a total cash investment of about $2,000,000 will amount to about $200,000. From this sum receivership expenses and other debts must be met.

Considerable office equipment, several car bodies, the former residence of the superintendent of the line, and twenty-six lots in the Great Northern addition to Virginia, remain to be disposed of, as well as a substation and waiting room at Chisholm.

In all, nine car bodies have been purchased by buyers, for a varied number of uses.

The company passed into the hands of the receivers, James C. Chestnut, Virginia, and Oscar Mitchell, Duluth, on March 7, 1924. Authority to abondon the line was granted by Judge Cant late last winter. The last passenger car was operated over the line from Hibbing to Gilbert on April 16 of this year, but freight car service was continued until June.

The interurban line was placed in service on Christmas day, 1912. The system comprised 40 miles of line.

Reorganization of Indianapolis & Cincinnati Traction Awaited

Intimation was made recently in Circuit Court at Rushville, Ind., that plans were afoot to perfect a reorganization of the Indianapolis & Cincinnati Traction company, as the time draws near for the official court order to sell the property involved in a mortgage that exceeds $2,000,000. The receivership case has been pending in court for several months, and has almost reached the point where the court is ready to order the receiver, Will M. Frazee, to sell the properties.

Receivers Discharged in Oklahoma City

The receivership of the Oklahoma Railway, Oklahoma City, Okla., under which the road has been operated since Dec. 28, 1924, was ended on Dec. 16 when George A. Henshaw, and G. T. Lackey, joint receivers turned the properties to Hubert R. Hudson and his associates, who recently acquired the controlling stock in the road.

Coincident with the announcement of the ending of the receivership, President Hudson declared that rearrangement of the financial structure of the road was under way.

Messrs. Henshaw and Lackey will continue in charge of the road until Jan. 1, at which time Mr. Henshaw will again devote all his time to his private law practice. Mr. Lackey plans now to remain with the company indefinitely, in order to assist with the reorganization. He has been with the railway since 1920, in an executive capacity.

When bondholders finally asked for a receivership late in 1924, the railway was at a low ebb, having seen a steady decline since 1921, as motor cars continued to increase in numbers. Mr. Henshaw, a former corporation commissioner and widely known attorney, was named by Judge Cotteral to be a joint receiver with John W. Shartel, then president of the company. Mr. Lackey succeeded Mr. Shartel, at Mr. Shartel's death eighteen months ago.

Since the receivership, however, the fortunes of the railway company have moved in a different direction. Increasing motor cars have made traffic congestion so terrific that street cars are hauling more people every month. Revenues for the first eleven months of 1927 were $1,913,645, compared with $1,570,967 during the similar period a year ago. For the first ten months of 1927 13,123,855 fares were collected. For the similar period last year the number was 11,796,215. The total for 1926 was 14,360,274. On the strength of the comparison for the first ten months of both years Charles Hoopes, operating manager, predicts that the total for 1927 will be approximately 16,000,000 fares.

Ten years ago the railway carried 14,301,323 passengers. By 1920, the peak year in the history of the company, the cars were carrying 20,532,897 passengers. In 1922, this figure was cut to 17,650,854. Then the slump continued in an alarming way until last year, which showed improvement over year before.

During the receivership the number of new type cars has been increased from ten to forty, while in all the company has in operation 126 street cars and 26 buses. Tracks are in excellent shape, it being pointed out that nearly $200,000 has been spent during the last year for repairs.

Intention of Appeal Filed by O'Fallon

Notice of intention to appeal to the United States Supreme Court was given by the St. Louis & O'Fallon Railroad on Dec. 19 when a special three-Judge Federal Court entered its formal order upholding the Interstate Commerce Commission's order for recapture of approximately $260,000 excess earnings of the railroad.

Decision in the O'Fallon case was announced Dec. 10. The suit has been regarded as the key case to the valuation of all railroads of the United States for ratemaking and the limitation of earnings.

Approval of $2,475,000 Note Issue Sought in St. Louis

Right to issue $2,475,000 of 5 per cent gold notes is sought by the St. Louis Public Service Company in an application filed with the State Public Service Commission. The application states that this is a part of the plan to facilitate the funding of the $36,300,000 of first mortgage bonds of the United Railways assumed by the successor company.

The first $9,000,000 of the United Railways will mature in 1934. The St. Louis Public Service Company proposes to give for each $1,000 bond $600 in cash, with interest at 6 per cent from Jan. 1, 1928, to date fixed for payment and $275 in gold notes.

The gold notes may be called for redemption in 30 days at the option of the company or converted at option of the holder into preferred stock of the St. Louis Public Service Company at the rate of three shares of the series "A" of the preferred cumulative dividend stock.

Conspectus of Indexes for December, 1927

Compiled for Publication in This Paper by

ALBERT S. RICHEY
Electric Railway Engineer, Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Street Railway Fares* 1913 = 4.84	Dec. 1927 **7.57**	Nov. 1927 **7.56**	Dec. 1926 **7.42**	Dec. 1927 **7.57**	May 1923 **6.88**
Electric Railway Materials* 1913 = 100	Dec. 1927 **140.6**	Nov. 1927 **141.3**	Dec. 1926 **159.2**	Sept. 1920 **247.5**	Dec. 1927 **140.6**
Electric Railway Wages* 1913 = 100	Dec. 1927 **228.4**	Nov. 1927 **228.3**	Dec. 1926 **226.3**	Sept. 1920 **232**	March 1923 **206.8**
Am. Elec. Ry. Assn. Construction Cost (Elec. Ry.) 1913 = 100	Dec. 1927 **200.7**	Nov. 1927 **199.4**	Dec. 1926 **203.2**	July 1920 **256.4**	May 1922 **167.4**
Eng. News-Record Construction Cost (General) 1913 = 100	Dec. 1927 **203.9**	Nov. 1927 **202.0**	Dec. 1926 **210.8**	June 1920 **273.8**	March 1922 **162.0**
U. S. Bur. Lab Stat. Wholesale Commodities† 1926 = 100	Nov. 1927 **96.7**	Oct. 1927 **97.0**	Nov. 1926 **98.4**		
Bradstreet Wholesale Commodities 1913 = 9.21	Dec. 1 1927 **13.53**	Nov. 1 1927 **13.39**	Dec. 1 1926 **12.78**	Feb. 1 1920 **20.87**	June 1 1921 **10.62**
U. S. Bur. Lab. Stat. Retail Food 1913 = 100	Nov. 1927 **156.5**	Oct. 1927 **156.1**	Nov. 1926 **161.6**	July 1920 **219.2**	March 1922 **138.7**
Nat. Ind. Conf. Bd. Cost of Living 1914 = 100	Nov. 1927 **164.2**	Oct. 1927 **163.7**	Nov. 1926 **168.2**	July 1920 **204.5**	Aug. 1922 **154.5**
Steel Unfilled Orders (Million Tons) 1913 = 5.91	Nov. 30 1927 **3.454**	Oct. 31 1927 **3.341**	Nov. 30 1926 **3.807**	July 31 1920 **11.118**	May 31 1927 **3.051**
Bank Clearings Outside N. Y. City (Billions)	Nov. 1927 **19.50**	Oct. 1927 **19.97**	Nov. 1926 **18.31**	Oct. 1925 **20.47**	Feb. 1921 **10.43**
Business Failures Number	Nov. 1927 **1660**	Oct. 1927 **1471**	Nov. 1926 **1614**	Jan. 1924 **2231**	Aug. 1925 **1353**
Liabilities (Millions)	**39.23**	**35.98**	**60.31**	**122.95**	**27.22**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population. Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen, conductors and operators on 136 of the largest street and interurban railways operated in the United States, weighted according to the number of such men employed on these roads.

†This index is changed to a base of "1926 = 100." That notation replaces the former basis of "1913 = 100." Inasmuch as the bureau has not calculated the index on this new base any further back than January, 1923, no figures are shown in this tabulation for the high and low points since the war. It is planned to compute the index on the new basis as far back as January, 1913. Until such time as the bureau makes public these figures for the earlier years this information will be lacking.

Tax Settlement Nets Saving for Akron Company

Suits brought by the Northern Ohio Power & Light Company, Akron, Ohio, in the federal court at Cleveland enjoining the collection of the 1925-26 utility taxes in Summit and other counties of Ohio have been settled. Under the settlement the company saves about $125,000 on its Summit County taxes for the two-year period involved.

In its suits the Northern Ohio Power & Light Company contended that its property was listed for taxation at practically its full value, while other property was listed on a basis of 40 to 50 per cent. The company made it plain that it had no desire to evade its taxes, but contended that the valuation of its property should be reduced or the valuation of other property be raised.

Some counties settled with the company immediately, but others served notice they would contest. The move just made ends the controversy. On a showing recently made before the State Tax Commission that assessments against the company were excessive and unfair compared with other assessments throughout the state the board reduced the tax valuation for future assessments nearly $4,000,000.

Would Foreclose on South Bend Property

The Harris Trust & Savings Bank of Chicago has filed suit in the United States District Court at Grand Rapids to foreclose on $536,000 of bonds of the Southern Michigan Railway, controlled by the Chicago, South Bend & Northern Indiana Railway. The bank asks for an accounting of all property and interest on bonds, the appointment of a receiver and an injunction enjoining officers of the interurban company from disposing of any property.

Borrowing from Peter to Pay Paul in Seattle

For the first time since the Seattle Municipal Railway, Seattle, Wash., began paying on the principal of its $15,000,000 bonded purchase debt eight years ago, it will not be put on a warrant basis to enable it to meet an installation due next March. Not that Seattle has the money ready, but simply that city officials plan to borrow from the Light and Water Departments since $4,000,000 of Light Department bonds were sold recently and not all of the money acquired through these bonds will be required by the Light Department for some time.

Last year loans totaling $600,000 were negotiated to tide the railway over after the banks of the Seattle Clearing House Association declined to cash the warrants issued to meet salary checks for the Dec. 24 payroll. The warrants carry 6 per cent interest, which interest, it is ingeniously explained, would be

paid by the railway on any sum it might borrow from the light department to tide the railway over.

Cars and Trestle on Deferred Payment Plan in Seattle

Seven members of the City Council of Seattle, Wash., and Mayor Bertha K. Landes have informally agreed to have C. W. McNear & Company, Chicago, purchase fifty new cars for the Seattle Municipal Railway and build a $715,000 trestle over the West Duwamish Waterway and lease both the cars and the trestle to the city of Seattle.

As a result of the agreement, a resolution stating that it is the intention of the Council to enter into an arrangement of this kind will be introduced at a special meeting of the Council shortly. Meanwhile Corporation Counsel T. J. L. Kennedy will be asked to pass upon the legality of the proposed contract.

The Pacific Car & Foundry Company, Seattle, is to be awarded the order for the cars while the trestle contract is to be let to a Seattle concern, if possible. McNear & Company proposes to lease the cars to the city for fifteen years under an arrangement by which the city will pay $50,000 a year during the first four years, and $120,000 a year during the next eleven years. At the expiration of the lease the cars would become the property of the city. An annual toll charge would be paid by the city during the twenty years of the lease of the trestle, the city taking over that structure at the end of that period.

Mayor Landes points out that this form of contract would probably cost the city more than if the cars and trestle were obtained by a straight bond issue, but with the present litigation in which the railway is involved, it has been found impossible to market railway bonds to provide the money needed for the cars and trestle.

Rochester Goes Slightly Behind

Street railway commissioner's report for year ended July 31 shows 3,781,385 fewer passengers with company $60,128 behind allowed return. Fares increased to 9 cents recently

CHARLES R. BARNES, city railways commissioner of Rochester, N. Y., has filed his report covering bus and trolley operations of the New York State Railways under the service-at-cost contract for the year ended July 31. His summary of operations shows 3,781,385 fewer passengers carried than during the previous year. The total number for the year ended July 31, 1926, is 91,717,817, while the total for the twelve months ended July 31, 1927, was 87,936,432.

The company failed by $60,128 to earn its guaranteed return last year. The accumulated deficit is $341,782.

In his report, Mr. Barnes commented on the increasing use of automobiles as hurting the company's revenues and branded as unfair the system whereby the railways must bear the cost of paving, which, he believes, should be levied on all taxpayers. He blames this situation for the recent increase in Rochester fares from 8 to 9 cents and deems it unfair that the street car riders must bear the burden.

In commenting on this condition, James F. Hamilton, president of the New York State Railways, said to a Rochester representative of the ELECTRIC RAILWAY JOURNAL:

Something must be done if street car companies are to conduct their business successfully. This cannot be accomplished unless the fare is kept low to encourage mass riding. Each year fewer riders are carried. The car rider must be protected from unjust distribution of paving costs.

Commissioner Barnes said that the profitable operation of buses depended on greater general use by the public. In this connection he said that the fact that riders on the trackless trolleys and on the buses are steadily increasing in number in the face of the decrease in trolley riders, which has been continuous throughout the life of the contract, is regarded as demonstrating a real necessity for this supplementary service. Mr. Barnes said in part:

To care for the travel 9,544,212 car miles were run with mileage for trackless trolleys totaling 230,790, and with bus mileage of 408,207. Generally speaking, the trolley mileage has been maintained up to the standard established in prior years. The mileage run by trackless trolleys and buses was increased substantially, the increase for trackless trolleys having been 10,567 miles, or approximately 5 per cent, while the mileage on the bus line was increased during the year almost 70 per cent, due principally to additional routes. The mileage of the operating system at the close of the year ending July 31, 1927, was as follows:

Trolley car trackage	169.14
Trackless trolley routes	2.75
Gasoline bus routes	58.35

The result of operation for the year showed for railway lines a profit of $1,611.51, but a deficit from supplementary service totaling $61,740 left an aggregate deficit for the year of $60,128, and an accumulated deficit at the end of the year of $341,462.

Among the outstanding items which have been increasingly manifest during the past year the following may be mentioned:

(a) Material improvement has been made in the condition and appearance of the rolling stock, and especially during the past year, to such an extent that at present the equipment meets, all of the requirements of safety, comfort and convenience of passengers.

(b) Substantial improvement has taken place in connection with the equipment and program for car heating, an item which is very necessary in connection with the health and well being of the car riders.

(c) The car lighting has been definitely improved and sufficiently to warrant the assertion that the street cars in Rochester are now really illuminated.

(d) Extensive reconstruction work was done during the year, including Main Street West, Main Street East, Plymouth Avenue and Lyell Avenue. In addition a large amount of money was expended in track and pavement maintenance throughout the system generally.

(e) As mentioned previously herein, the

REPORT OF ROCHESTER RAILWAY FOR YEAR ENDED JULY 31

	Railways	Bus Lines	Combined
Revenues from Transportation:			
Passenger revenues	$5,161,261	$118,875	$5,280,136
Chartered car revenues	3,000	.....	3,000
Bus rentals	.....	1,855	1,855
Mail revenues	87	.....	87
Miscellaneous transportation revenues	1,745	132	1,878
Total revenue from transportation	$5,166,095	$120,862	$5,286,958
Revenues from Other Railway Operations:			
Station and car privileges	$60,685	.....	$60,685
Rent from tracks and facilities	35,002	.....	35,002
Rent from buildings and other property	22,234	.....	22,234
Miscellaneous operating revenues	.....	1,271	1,271
Total revenue from other railway operations	$117,921	$1,271	$119,193
Total operating revenues	$5,284,017	$122,134	$406,151
Operating Expenses:			
Maintenance of ways and structures	$478,086	.....	$478,086
Maintenance of equipment	398,389	.....	398,389
Power expenses	289,067	.....	289,067
Conducting transportation	1,667,279	.....	1,667,279
Traffic expenses	10,370	.....	10,370
General and miscellaneous expenses	552,803	.....	552,803
Renewals and depreciation	360,000	.....	360,000
Total operating expenses	$3,755,996	$167,817	$3,923,814
Net operating expenses (deficit)	$1,528,020	$45,682	$1,482,337
Auxiliary operating revenues	$2,908	.....	$2,908
Auxiliary operating expenses	3,519	.....	3,519
Auxiliary operating deficit	$610	.....	$610
Net revenue—All operations (deficit)	$1,527,409	$45,682	$1,481,726
Taxes assignable to operations	352,213	1,896	354,110
Operating income (deficit)	$1,175,196	$47,579	$1,127,616
None-operating income	4,217	.....	4,217
Gross income	$1,179,414	$47,579	$1,131,834
Return on investment	1,177,802	14,160	1,191,963
Service-at-cost operating surplus or deficit	$1,611	$61,740	$60,128

mileage made by trackless trolleys and gasoline buses has been materially increased.

(f) During the year there were no material changes in car routeing. Some minor changes were made in car stops.

(g) During the year there were no extended interruptions to service resulting from failure of power supply.

No change in the rate of fare charged was made in the year ended July 31, 1927, although in accordance with the terms of the contract, an increase in fare was warranted. Subsequently and since the close of the year, the company served notice of a fare increase which became effective as of Dec. 1, 1927. Even with this later increase, the cash rate of fare charged in Rochester remains lower than it does in any other large city in the State, except New York City, and also remains lower than in practically all other large cities throughout the country. That in its fare increase Rochester has been consistently behind the rest of the cities was due to two things: First, the economical operation which has been possible under the terms of the contract, and secondly, the reluctance of the company to insist upon an enforcement of the terms of the contract while there was any hope that conditions would change in such a way as to make an increase unnecessary.

The increase in the rate of cash fare from 8 cents to 9 cents took effect after the close of the fiscal year but because of that increase in rate, it is deemed pertinent and advisable to refer to what was set forth in the previous annual report on this important factor in the raise of fare, viz.: The unjust charge borne by the street car riders for paving the streets of the city, which pavement they do not use. While the former report dealt in detail with this subject, general discussion of it has been so extensive that it is believed the public generally are convinced of its injustice, and it is hoped that corrective measures will be taken in the near future to relieve the car rider of this burden. The recent increase in rate of fare brings the subject directly home to the car riders, as, were it not for the amount of money spent for the purpose of paving, the deficit which caused the increase in fare would not exist. This burden on the car riders is not a condition confined to operation under the service-at-cost contract. In some cities the law has been modified relieving transportation systems of paving costs, but in all other cities these paving expenses affect the rate of fare paid by the car riders.

In the report for the year ended July 31, 1926, considerable space was devoted to the underlying need for additional transportation facilities, and to the considerations which have been developed to increase the service by means of trackless trolleys and gasoline buses. It was then said that under circumstances such as were in force in Rochester, supplementary service of the character required only infrequently paid their full way from the start. That there was a need for service of this kind has been amply demonstrated by the results of operation for the past. During this time the volume of such travel steadily increased, that on the gasoline buses being double what it had been during the first year of gasoline bus operation, while the trackless trolley volume increased more than 10 per cent.

This business has not as yet reached a point where it is paying its way in full, but having in mind the substantial benefits which this growth of service has conferred upon the city at large, by way of increased availability and flexibility of service, it has justified itself.

Personal Items

D. Boal Succeeds E. J. McIlraith in Chicago

Daniel Boal, formerly assistant superintendent of schedules and time-tables of the Chicago Surface Lines, Chicago, Ill., was appointed superintendent of the department on Dec. 1 to succeed E. J. McIlraith, acting superintendent. Mr. McIlraith continues as staff engineer of the company.

The new superintendent entered the service of the Chicago City Railway (the south side lines) in 1902, as a window washer, and was later transfer clerk, working nights. At the same time he was attending the University of Illinois medical school, from which



Daniel Boal

institution he was graduated in 1906. In 1909 Mr. Boal went to Seattle, Wash., where he entered the mechanical department of the Seattle railway system, then known as the Seattle Division of the Puget Sound Traction, Light & Power Company. The following year he accepted a position in the schedule department of the company, where he remained until 1919. In that year he went to the Philadelphia Rapid Transit Company, and remained with that company for one year. Returning to Seattle in 1920 Mr. Boal remained there until May, 1923, when he entered the schedule department of the Chicago Surface Lines as assistant to Mr. McIlraith.

Personnel Changes in Minneapolis Suburban Line

At a special meeting on Dec. 5 H. E. Pence was elected president of the Minnesota Western Railroad and the Electric Short Line Terminal Company. He is president of the Minneapolis, Northfield & Southern, which recently acquired control of the two other companies. W. R. Stephens was made vice-president of the two lines, E. C. Bahr secretary-treasurer of the Minnesota Western and F. C. Malcolmson of the Electric Short Line Terminal Company. The terminal is used by the Anoka and the Cuyuna Range trolley line trains as well as the gaso-electric passenger trains of the Southern and the Western lines, which are three suburban railways operating north, south and west.

A Railway Specialist Inspires News Writer

Col. William C. Lancaster, grade crossing protectionist and electric railway specialist, was made the subject of a personal sketch in the Brooklyn *Eagle* for Nov. 13. Colonel Lancaster has done many big things in tunnel construction work, ship enterprises and power development, but electric railways are his hobby.

At the present time he is with the New York Transit Commission applying his knowledge of electrical and civil engineering in the post of chief engineer. He has charge not only of all the engineering work in connection with the regulation of New York City's rapid transit and surface lines but also of the grade crossing elimination program for the five boroughs of the city. He is chairman of a committee designated to investigate the practicability of a lighter steel car to operate on New York City's elevated structures where wooden cars now operate, because the structures are not strong enough to carry steel cars of the present design.

Among his other accomplishments Colonel Lancaster helped to work out plans for equipping many of the rapid transit lines in New York City with automatic block signals and designed a system of gauntlet tracks on the lines running into Queens. From Havana to Canada Mr. Lancaster is known for his constructive genius and initiative in carrying through some important construction projects.

L. C. Singleton is the new superintendent for the Eastern Texas Electric Company, Beaumont, Tex. He succeeds Charles A. Brann. Mr. Singleton has been with the Eastern Texas Electric Company in Beaumont since 1919 in the capacity of claim agent and safety director. He plans to carry out the work of improvement started by his predecessors.

Dwight Foust, a former dispatcher of the Northern Ohio Power & Light Company, Akron, Ohio, has been chosen instructor of the permanent training course for the electric railway operators of that railway. He will have charge in Akron, Canton and Massillon. Mr. Foust is a graduate of Wittenberg College. He began train service in Canton. Later he was transferred to Akron, being promoted from trainman to dis-

patcher for his outstanding efficiency. Mr. Foust has been dispatcher in the Kenmore yards for several years.

FRED E. SWAIM, a public accountant of Huntington, Ind., has been appointed assistant in the accounting division of the Indiana Public Service Commission. Mr. Swaim succeeds R. L. Gwinn, recently resigned.

F. W. ALLARD, formerly first aid instructor of the roadway department of the Georgia Power Company, Atlanta, Ga., has been appointed director of all safety work in the roadway department. Mr. Allard succeeds W. J. Adams, resigned.

FRANK T. SINGLETON, chairman of the Indiana Public Service Commission, has been selected as one of the directors-at-large of the National Safety Council, it has been learned in Indianapolis. Mr. Singleton's term is for three years. Since he was chosen as safety member of the Indiana commission in 1924 he has taken an active interest in safety measures, particularly those pertaining to public utilities.

ROBERT L. BEYERLE has been selected general foreman of the Silver Lake Junction shops of the Northern Ohio Power & Light Company, Akron, Ohio, in place of Fred J. Sarbach, who died recently. Mr. Beyerle has been with the company since 1910 with the exception of one year, in which he was in the aviation corps as a mechanic. He was born in Ohio. His predecessor was foreman of the Silver Lake shops for several years.

HUGH DOAK has been appointed assistant director of the Tennessee Public Utility Information Bureau, according to announcement by Guy P. Newbern, director. Editor of the Manchester *Times* and State vice-president of the National Editorial Association, Mr. Doak is a newspaper man with more than twenty years experience, having started his newspaper career on the *Cannon Courier*, Woodbury, Tenn., in 1905. He worked on various other Tennessee newspapers and for a time was in the commercial printing business in Nashville. In 1913 he purchased the Manchester *Times* and has operated that newspaper since. Mr. Doak will retain his newspaper interest as owner and editor of the Manchester *Times*, in addition to his new duties.

W. H. SWINNEY of New York City is now serving as comptroller of the West Penn Electric Company and subsidiary companies with his office in Pittsburgh, Pa. Prior to his joining the West Penn, Mr. Swinney was associated with the American Telephone & Telegraph Company, serving for three years as staff accountant to the comptroller at the New York office. Mr. Swinney's previous business connections were with the Interstate Commerce Commission at Washington, with which he worked for ten years, in the latter period as assistant director of accounts. He also served as traveling auditor for the St. Louis Southwestern Railway, with office at St. Louis. He is a native of Florence, Tex. He received his education at Lockney College in that state.

H. H. Hanson Heads Middlesex & Boston Street Railway

Harry H. Hanson, who has served as vice-president and general manager of the Middlesex & Boston Street Railway, Waltham, was elected president of the corporation effective on Dec. 1. In this capacity he succeeds Pitt F. Drew, who has been chosen chairman of the board of directors.

Mr. Hanson entered railway work in 1889 as a conductor for the Boston Elevated Railway. Through the various grades in the operating department he advanced, becoming district supervisor in 1901, at the Dudley Street terminal, Roxbury district. In 1913 he was appointed superintendent of District No. 2, and served in this capacity until he



H. H. Hanson

was transferred to work of more responsibility. He served as superintendent of Division No. 7 for two years, with headquarters at Cambridge. Mr. Hanson became general superintendent of the Middlesex & Boston Street Railway in 1919, continuing in that capacity until his promotion to the general managership in 1920.

OBITUARY

Gen. Charles Miller

Gen. Charles Miller, 84 years old, retired oil millionaire and one of the founders of the Galena Signal Oil Company, died at his home in Franklin, Pa., on Dec. 20.

General Miller until eleven years ago was president of the Galena Signal Oil Company, and a son, J. French Miller, is now secretary-treasurer. He was Franklin's foremost resident, noted for his liberality and for many and varied interests. Heart disease was the cause of death.

He came to the United States from Alsace, France, his birthplace, while still in his teens, and his first occupation was selling sewing machines. His business career was interrupted by his service with the Union Army during the civil war and since that time had shown a keen interest in military affairs. Franklin's first modern hotel, the Alsace, was built by the General.

At the time of his death he was president of the Lake Erie, Franklin & Clarion Railroad, which he built 22 years ago; president of the Franklin Railway Oil Company and of the General Manifold Printing Company. He had an interest in the Hotel Latham of New York city and was a frequent business visitor in New York.

Harvey Hubbell

Harvey Hubbell, president of Harvey Hubbell, Inc., Bridgeport, Conn., manufacturer of electrical devices, died on Dec. 17 at his home in that city. A leader in the machinery field, Mr. Hubbell had to his credit more than 100 patents for his inventions making for the perfection of electrical switches and sockets and machine tools. He was born in Brooklyn, N. Y., and received his technical education at Cooper Institute in New York. His early experience was obtained with builders of printing presses and in ship and marine engine works. In 1888 Mr. Hubbell removed to Bridgeport to establish a small plant, and seventeen years later he incorporated the business, of which he was president for many years, under its present name.

E. P. Morris

Elmer P. Morris, 65, died on Dec. 11 at his home in East Orange, N. J. For a long while he was head of E. P. Morris & Company, New York, dealers in railway equipment. In 1889 the Cincinnati Street Railway, then the Cincinnati Traction Company, decided to electrify its horse car line on Colerain Avenue for a distance of about 6 miles. Bert Baldwin was employed to study the few electric railway lines then in operation in the United States and following his recommendations contracts for the Cincinnati work were awarded to the Thomson-Houston Company, Lynn, Mass., now a part of the General Electric Company. It was Mr. Morris, then employed by the Eastern company, who is said to have decided upon the double trolley system, still in use in Cincinnati. Later, Mr. Morris established himself in business in Cincinnati, but subsequently he returned to the East.

LOUIS A. CHRISTIANSEN, principal of the Corporation Service Bureau, Cleveland, Ohio, died recently. Mr. Christiansen was a member of the American Electric Railway Association for a number of years and was known for his work as an investigator. In solving problems of all sorts he cooperated with a number of electric railway officials. The Corporation Service Bureau will continue to operate as it has in the past.

Manufactures and the Markets

No Cars Destroyed in Recent Ohio Carhouse Fire

No cars were lost in the recent fire which destroyed the carhouses and shops of the Columbus, Delaware & Marion Electric Company at Stratford, near Delaware, Ohio. Recent advices are that temporary buildings are practically completed for handling and running repair work.

Stock Dividend Declared by Ohio Brass

The Ohio Brass Company, Mansfield, Ohio, has declared a 20 per cent stock dividend on class "A" and "B" shares, payable in class "B" shares to stock of record Dec. 27. The company also declared quarterly dividends of $1.25 on the class "A" and "B" stocks and $1.50 on preferred, payable on Jan. 15 to stock of record of Dec. 31. The new class "B" stock will participate in the dividend.

Kansas City, Leavenworth & Western Gets New Cars

Four new cars embodying the latest features of safety, comfort and economy in electric railway equipment were recently introduced by the Kansas City, Leavenworth & Western Railway, Kansas City, Kan. The order for these cars was noted in the ELECTRIC RAILWAY JOURNAL Aug. 13 and description, specifications, elevation and plan appeared in the Nov. 5 issue.

The installation of these cars, it is reported, climaxes a year's activity in which $100,000 has been spent rehabilitating the line.

V.E.P. Expects Recent Bus Order Deliveries in January

Bus equipment ordered recently by the Virginia Electric & Power Company will be delivered early in January, company officials expect. The ten new buses ordered, at a cost of $120,000, will have seats for 40 persons each.

One of the new type of vehicles which has arrived resembles a one-man street car. Its motor is located in the center of the vehicle to reduce the wheelbase. Some of the 29-passenger buses now in operation here, it is reported, have difficulty negotiating turns at narrow street intersections.

Five One-Man, Two-Man Cars Received by East St. Louis & Suburban



Typical exterior of the five new one-man, two-man city type cars recently put in service by the East St. Louis & Suburban Railway, East St. Louis, Ill. Note the streamline effect obtained by the color scheme

FEATURED with a parade headed by Mayor Frank Doyle and other city officials, five one-man, two-man, city type cars were inducted into service Nov. 23 by the East St. Louis & Suburban Railway, East St. Louis, Ill. The cars, which were ordered from the St. Louis Car Company early in the summer and for which specifications were printed in the JOURNAL for July 9, will be used on the State Street and 42d Street lines. One of these cars was exhibited at the Cleveland convention last October under the name of the "President's Car" or "Rail Sedan." When placed in service the new cars were operated free of charge during the first day. The units supplement the service of six rebuilt cars which were put in operation May 7.

Subjoined are specifications:

Number of units	Five
Type of unit	One-man, two-man, motor passenger, city, double-end, double-truck
Number of seats	48
Builder of car body	St. Louis Car Co., St. Louis, Mo.
Date of order	May 24
Date of delivery	October, 1927
Weight, approximately	32,000 lb.
Bolster centers	22 ft.
Length over all	47 ft. 3 in.



Ample aisle room, light, and comfortable leather-covered seats are some of the features of the new East St. Louis cars, which were built by the St. Louis Car Company

Length over body posts	31 ft. 4 in.
Truck wheelbase	5 ft. 4 in.
Width over all	8 ft. 6 in.
Height, rail to trolley base	10 ft. 6 in.
Window post spacing	2 ft. 6 in.
Body	All steel
Roof	Arch
Doors	End, folding
Air brakes	Westinghouse
Axles	Heat-treated
Car signal system	Faraday
Compressors	DH-16
Control	K-75, low level
Curtain fixtures	National Lock Washer
Curtain material	Pantasote No. 86
Destination signs	Hunter
Door mechanism	National Pneumatic
Energy-saving device	Economy meters
Finish	Enamel
Floor covering	Linoleum
Gears and pinions	Tool Steel Gear & Pinion Co.
Glass	Plate in side windows; non-shatterable in vestibule
Hand brakes	St. Louis Car Co.
Hand straps	Electric Service Supplies No. 26572
Heaters	Consolidated
Headlights	Golden Glow
Headlining	Agasote
Interior trim	Mahogany
Journal bearings	Plain 3¼ in. x 7 in.
Journal boxes	St. Louis Car Co.
Lamp fixtures	Safety Car Lighting, dome fixture
Motors	General Electric No. 264, inside hung
Sash fixtures	Dura
Seats	St. Louis Car Co., leather reversible
Seat spacing	30 in.
Seating material	Genuine Spanish leather
Steps	Folding
Step treads	Feralun
Trucks	St. Louis Car Co. EIB 64
Ventilators	Nichols-Lintern
Wheels, type	Rolled steel, diameter 26 in.
Special devices	Oakelite; National Pneumatic treadles; variable load brake

$900,000 New Equipment Program of North Shore

New equipment and rolling stock costing more than $900,000, it was recently officially announced, are being built for the Chicago, North Shore & Milwaukee Railroad, Chicago, as a part of an extensive program of enlarging facilities in all branches of its service. The equipment is of the latest design and all of the units are scheduled to be in service by next summer.

The largest single item in the program consists of fifteen all-steel, passenger, motor cars ordered from the Pullman Car & Manufacturing Corporation, Chicago, on Oct. 1 and reported in the ELECTRIC RAILWAY JOURNAL Oct. 22. The cars will be equipped with individual bucket type easy chairs upholstered in gray byzantine plush. One of the cars will be equipped with Hyatt roller bearings to test the riding comfort of cars thus equipped in high-speed electric operation. There will be two toilets and a smoking compartment in each car. Deliveries are expected next May.

Two additional dining cars and another parlor-observation car of all-steel construction are also being built for the North Shore Line at the Pullman plant. The diners seat 24 persons each. The cars are to be delivered to the road next May.

The fifteen additional semi-trailers for freight service of 8-ton capacity, scheduled for delivery in December by the Trailmobile Company of Cincinnati, Ohio, are to be used in handling door-to-door shipments. The units are mounted and transported between stations on flat cars with the trailer wheels still attached and without any handling of merchandise from the time the shipment leaves the shipper's door until it reaches the consignee.

Three 5-ton gasoline tractors were recently delivered to the railway by the White Motor Company of Cleveland, Ohio, and are now in service. The tractors are used in hauling trailers to and from freight receiving depots in Chicago and Milwaukee. The North Shore Line is the first railroad in the United States, it is understood, to place flat car trailer equipment of this type in regular service.

The ten lightweight, double-truck, one-man, two-man safety cars ordered from the St. Louis Car Company for service on Milwaukee city divisions of the North Shore Line are expected to be delivered about the last of the month. Announcement of the placing of the order appeared in the July 16 issue of ELECTRIC RAILWAY JOURNAL. These cars, which are 51 ft. long, have a seating capacity of 56 persons each and the seats are upholstered in green plush. Designed for either one-man or two-man operation, the cars are completely equipped with safety devices. Two of the cars will be equipped with Timken roller bearings.

The two additional freight locomotives built by the General Electric Company, the first of their type ever constructed, are equipped for operation either on trolley or storage battery circuits. They are 40 ft. long and weigh approximately 131,000 lb. each.

Fifty New Cars for Seattle

The contract for fifty new cars intended for use on the Seattle, Wash., lines of the Seattle Municipal Railway is to be awarded to the Pacific Car & Foundry Company, Seattle, under a plan for financing to which reference is made elsewhere in this issue.

Twenty-seven Thousand Employees Bondholders

Twenty-seven thousand, or 42 per cent, of the employees of the General Electric Company in its service for six months or more are holders of about $30,000,000 face value of G.E. employees' securities corporation bonds, an average of approximately $1,000 per person. These bonds pay 6 per cent interest, but so long as the original holder remains in the employ of the General Electric Company an additional 2 per cent is paid by that company.

ROLLING STOCK

MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY, Milwaukee, Wis., is equipping one of its interurban articulated dining and passenger car units with Hyatt roller bearings. The company has been using Hyatt bearings under one of its articulated city units for approximately two years.

SHOPS AND BUILDINGS

MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY, Milwaukee, Wis., and its subsidiary, the Wisconsin Motor Bus Lines, it is reported, will house all of their buses operating out of Racine, Wis., in the new bus storage building being erected in that city at a cost of about $10,000. The building will accommodate 30 buses. It will measure 48 ft. x 150 ft.

METAL, COAL AND MATERIAL PRICES
F. O. B. REFINERY

Metals—New York	Dec. 20, 1927
Copper, electrolytic, cents per lb.	13 675
Copper wire, cents per lb.	15.75
Lead, cents per lb.	6 50
Zinc, cents per lb.	6.00
Tin, Straits, cents per lb.	58.00
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	.....
Somerset mine run, Boston, net tons	.....
Pittsburgh mine run, Pittsburgh, net tons	.....
Franklin, Ill., screenings, Chicago, net tons	1.60
Central, Ill., screenings, Chicago, net tons.	1.50
Kansas screenings, Kansas City, net tons	2.175
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	5.50
Weatherproof wire base, N.Y., cents per lb.	16.50
Cement, Chicago net prices, without bags	2.05
Linseed oil (5-bbl. lots), N. Y., cents per lb.	10.6
White lead in oil (100-lb. keg), N. Y., cents per lb.	13.25
Turpentine (bbl. lots), N. Y., per gal.	0.63

TRADE NOTES

WHITE COMPANY, Cleveland, Ohio, has recently announced the following promotions: W. C. Pahlman, manager of the company's branch at Wichita, Kan., to manager at Oklahoma City; E. O. Bittner, former Tulsa, Okla., company salesman, to manager at Wichita.

HYMAN-MICHAELS COMPANY, Chicago, has recently been appointed sales agent for the Mid-West territory of the Ohio Locomotive Train Company and its subsidiary, the Toledo Crane Company, manufacturer of locomotive trains, overhead traveling and gantry cranes, steam, electric and gasoline operated.

AMERICAN HAMMERED PISTON RING COMPANY, Baltimore, Md., through W. C. Stettinius, president, has announced the election of T. Latimer Ford as vice-president. For a number of years Mr. Ford was assistant secretary and treasurer of the company and for the past four or five years has had charge of the Pacific Coast territory. In addition to his executive duties he will have charge of automotive replacement sales. His headquarters will be at the main office in Baltimore.

LUDLUM STEEL COMPANY, Watervliet, N. Y., has issued a loose-leaf booklet which it advises is devoted to a treatise on the new Nitriding process for the hardening of steel. The publication is entitled "Nitrolloy and the Nitriding Process." The following subjects are taken up in six chapters: "Nitralloy and the Nitriding Process." "The Analyses of Nitralloy," "The Physical Properties of Nitralloy," "The Operations Prior to Nitriding," "The Nitriding Process and Equipment" and "The Properties of the Nitrided Case." It also contains a tabulation of nitralloy-physical properties as well as some charts.

ADVERTISING LITERATURE

ELECTRIC SERVICE SUPPLIES COMPANY, Philadelphia, Pa., has issued an illustrated folder descriptive of its Golden Glow headlight.

IRVING IRON WORKS COMPANY, Long Island City, N. Y., has recently issued an illustrated bulletin, 2D, descriptive of its "Safkar Safstep."

ARMCO CULVERT MANUFACTURERS ASSOCIATION, Middletown, Ohio, has recently issued a booklet entitled "Paving the Culvert to Combat Erosion."

GENERAL ELECTRIC COMPANY, Schenectady, N. Y., has sent out looseleaf bulletins GEA-37B and GEA-528A, descriptive of direct-heat electric furnaces types AD, RRB and RRC and centrifugal air compressors, small, multistage respectively. It has also issued another looseleaf bulletin, GEA-573A, entitled "Automatic Switching Equipment," covering synchronous converters in railway service.

—and New Orleans orders 20 new cars equipped with "Peacock" Staffless Brakes!

Reg. U. S. Pat. Off.

New Orleans Public Service, Inc., has just ordered twenty all steel, double-truck, double-end, one-man-two-man cars to be built by the St. Louis Car Company and the Perley A. Thomas Car Works equipped with "Peacock" Staffless Brakes.

With a seating capacity of 52 and weighing 40,000 lbs. these cars were delivered December 1st.

May we tell you why this Company and nearly all the buyers of new cars specify "Peacock" Staffless Brakes?



National Brake Company, Inc.

890 Ellicott Square Buffalo, N. Y.

Canadian Representative

Lyman Tube & Supply Co., Ltd., Montreal, Can.

New Orleans Cars to Be Delivered in November

Details for the twenty new cars ordered by the New Orleans Public Service, Inc., on Aug. 22, 1927, have been released. The cars are being built by the St. Louis Car Company and the Perley A. Thomas Car Company and will be delivered near the end of November. They are all-steel, double-truck, double-end cars designed for one-man or two-man operation. The seating capacity is 52 and the total weight 40,000 lb. Previous mention of the order appeared in the JOURNAL of Aug. 20.

The specifications as given by the New Orleans Public Service are as shown below:

Number of cars	20
Date order was placed	Aug. 22, 1927
Date of delivery	90 days
Builder of car body	Ten, St. Louis Car Company; ten, Perley A. Thomas Car Company
Type of car	Double-truck, double-end, one-man, two-man safety car
Seating capacity	52
Weight	Total, 40,000 lb.
Length over bumpers	48 ft. 2 in.
Length of body	34 ft. 2 in.
Width over all	8 ft. 7 in.
Height, rail to trolley base	11 ft. 1⅞ in.
Body, type	Steel, arched roof
Interior trim	Cherry
Roof	Poplar and No. 8 duck
Air brakes	Westinghouse air brake and General Electric
Axles	Standard Forging Company
Bumpers	Hedley anti-climber
Buzzers	Faraday
Car trimmings	Bronze
Conduits and junction boxes	Steel
Control	K-35-JJ
Curtain fixtures	Curtain Supply Company
Curtain material	Pantasote
Destination signs	Keystone
Door-operating mechanism	National Pneumatic
Gears and pinions	General Electric and Westinghouse
Hand brakes	Peacock staffless
Headlights	Ohio Brass, type ZP
Headlining	Agasote
Journal boxes	Brill M.C.B.
Lightning arresters	Aluminum cell
Motors	Four G.E. 265-G and Westinghouse 510-E
Paint	Murphy Varnish Co.
Registers	International R-11
Sanders	Nichols-Lintern
Sash fixtures	Curtain Supply Co., brass sash
Seats	Hale & Kilburn
Seating material	Wood slat
Side and center bearings	Brill
Slack adjusters	American Brake Co., type "X"
Springs	Brill
Step treads	Kass
Trolley catchers	Ohio Brass
Trolley base	Ohio Brass No. 11398
Trucks	Brill 76-E-1
Ventilators	Railways Utilities Co.
Wheels	Southern Car Wheel Co.
Wheel Guards	H-B life guard Consolidated Car Fender Company
Miscellaneous	Ellcon 1-in. white enamel stanchions

(*Electric Railway Journal October 15, 1927, p. 764*)

ANNUAL

Statistical and *Forecast* *Number*

Electric Railway Journal
January 14, 1928

This important number will contain:

Record of 1927 in costs and revenues.

Number of cars purchased.

Miles of track constructed and reconstructed.

Financial records for 1927.

Reviews of basic tendencies in legal, financial and regulatory matters.

A review of the significant news developments of 1927.

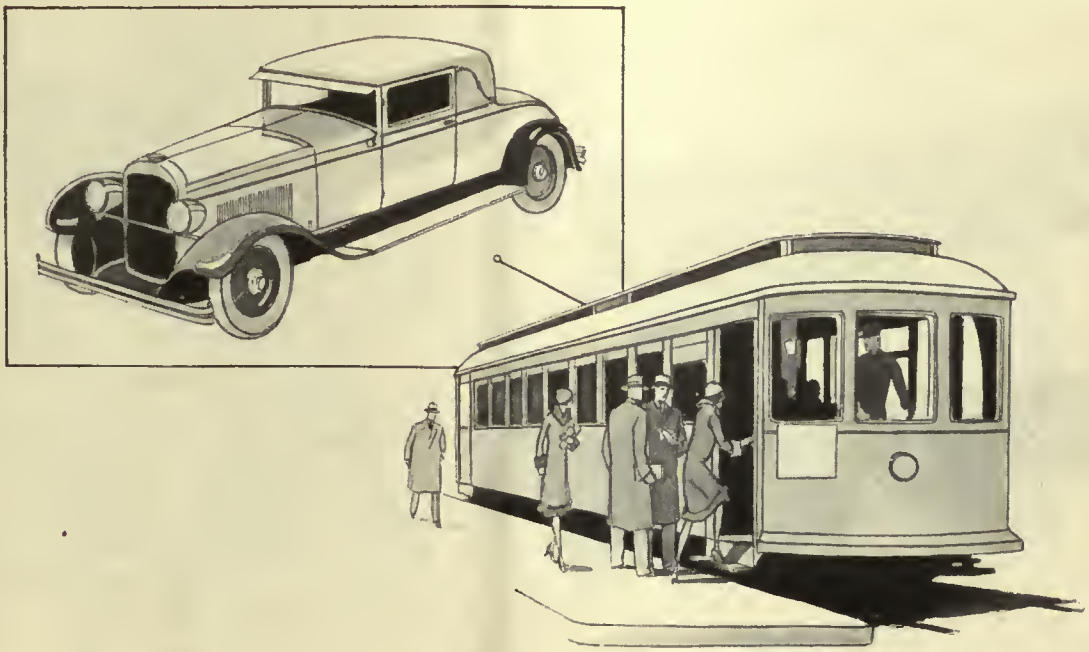
Together with:

A forecast of 1928 expenditures in all departments, and the trends which will shape developments and progress of 1928.

Advertising forms close January 3, 1928

Electric Railway Journal
Tenth Ave. at 36th St., New York City

Member ABC Member ABP



The steady increase in number of *Duco-finished cars*

THE progress of Duco finish in the railway field has been as steady and sure as its progress in the automotive field. The latter industry came first but railway operators were quick to recognize the merits of a finish which greatly exceeded old-type finishes in durability, under all conditions of service, and reduced production costs.

Duco finish on cars has definitely proven its superiority, and is daily being specified for additional equipment.

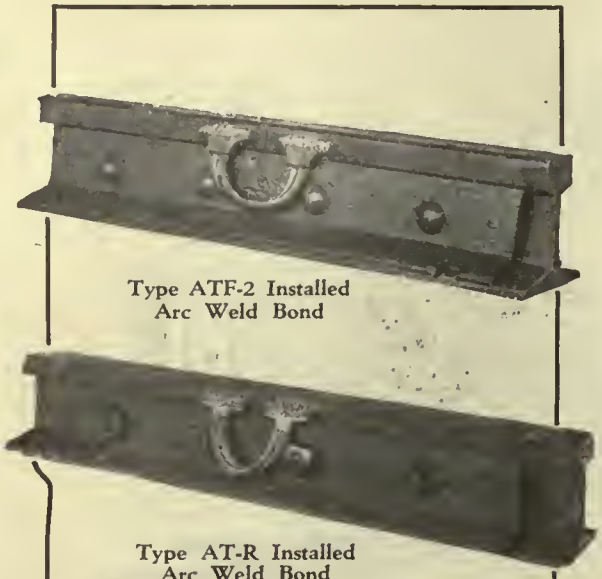
E. I. du Pont de Nemours & Co., Inc., Chemical Products Division, Parlin, N. J., 2100 Elston Ave., Chicago, Ill., 569 Mission St., San Francisco, Cal.

There is only ONE Duco . . . DU PONT Duco

DUPONT DUCO

REG. U.S. PAT. OFF.

PAINTS - VARNISHES - ENAMELS - DUCO



Type ATF-2 Installed
Arc Weld Bond

Type AT-R Installed
Arc Weld Bond

It's Easy

To apply Erico Arc Weld Bonds—bonding men know that. All that's needed is a portable welding outfit, one operator and a helper.

Either type ATF-2 or type AT-R bonds may be applied to the ball of the rail. The heavy drop forged steel terminals of the type ATF-2 bond can be quickly welded to the rail using 3/16-in. diameter rod. The type AT-R bond, with its narrow round steel terminal, is exceptionally easy to apply. The arc clings to the rounded steel surface without sputtering, making a good sound weld certain. Both types of bonds have the bond cables brazed to the steel terminal.

Plan to use Erico Bonds in 1928—get the information now. Write.

The Electric Railway Improvement Company

2070 East 61st Place, Cleveland, Ohio



Structural Shapes · Steel Sheet Piling
Plates · Skelp
Bars and Bar Mill Products
Bands · Hoops
Axles · Wrought Steel Wheels
Rails · Rail Joints
Steel Cross Ties

CARNEGIE STEEL COMPANY
General Offices · Carnegie Building · 434 Fifth Avenue
PITTSBURGH PENNSYLVANIA

1839

ELECTRICAL INSULATION

PERFECT MICANITE INSULATOR and PERFECT EMPIRE INSULATOR

Micanite and Super-Micanite Sheets, Commutator Segments, and Commutator Rings.

Micanite Tubes and Washers

Linotape, Seamless or Sewn Bias
(Yellow or Black Varnished Tapes)

Empire Oiled Cloths and Papers
(Yellow or Black)

Compounds, Varnishes, Etc.

Send for catalog and helpful booklet on Commutator Insulation and Assembly

MICA INSULATOR COMPANY
Largest manufacturers in the world of mica insulation.
Established 1893.
New York: 68 Church St. Chicago: 542 So. Dearborn St.
Cleveland Pittsburgh Cincinnati
San Francisco Los Angeles Seattle
Works: Schenectady, New York. Victoriaville, Canada; London, England



ISIKAFF

The Kaffir picks up soup by dipping *Isikaff* (native bread) into it. Then he leans back, holding the bread above his mouth and letting the soup drip into the open orifice.

This is the one *silent* method of overcoming soup. We are strong for it—because we are strong for silence.

Silence has *made* Morganite—silent commutation as a result of a Morganite brush prescription. In other words, Morganite destroys the noise that annoys an operator.

Morganite Brush Co., Inc.

Main Office and Factory
3302-3320 Anable Ave., Long Island City, N. Y.

DISTRICT ENGINEERS AND AGENTS

Pittsburgh, Electrical Engineering & Mfg. Co., 909 Penn Ave.
Cincinnati, Electrical Engineering & Mfg. Co., 607 Mercantile Library Building.
Cleveland, Electrical Engineering & Mfg. Co., 320 Union Building.
Baltimore, O. T. Hall, Sales Engineer, 432 North Calvert St.
Revere, Mass., J. F. Drummey, 75 Pleasant Street.
Los Angeles, Special Service Sales Co., 502 Delta Building.
San Francisco, Special Service Sales Co., 202 Russ Building.
Toronto, Can., Railway & Power Engineering Corp., Ltd., 101 Eastern Ave.
Montreal, Can., Railway & Power Engineering Corp., Ltd., 68-70 St. Antoine St.
Winnipeg, Can., Railway & Power Engineering Corp., Ltd., P. O. Box 328.

Do You Buy Repairs For Your Packard At the Five and Ten?



Trolley Pole Stock in Nuttall Store Room

Not on your life. You know that only Packard can turn out Packard cars and parts—you can't afford to take any chances.

But how about trolley parts and accessories? You should see some of the junk *we* see. Oh Man! soft, scrap brass trolley wheels, where the best of phosphor bronze is hardly good enough. Heavy, cast iron harps, where lightest malleable iron or forgings have their own troubles to stand the gaff.

Poles made of almost any kind of tubing, where heat treated steel, reinforced, carefully swedged and tapered is Nuttall Standard.

Springs!—well just springs, that's all. A spring is a spring, but the service requires the Nuttall Spring, designed to give the right tension, the right wheel contact pressure on the wire—oil tempered springs that *spring* and don't set.

Trolley parts—run of mines stuff—actually cost you more money than genuine, guaranteed Nuttall parts. No substitute is ever as good. Ask the man with a glass eye.

Send for a Nuttall Catalog and Price List

1927

R. D. NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railway and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.

Bankers and Engineers

Ford, Bacon & Davis
Incorporated
Engineers
115 Broadway, New York
PHILADELPHIA CHICAGO SAN FRANCISCO

The J. G. White Engineering Corporation
Engineers—Constructors
Oil Refineries and Pipe Lines, Steam and Water Power Plants, Transmission Systems, Hotels, Apartments, Office and Industrial Buildings, Railroads.
43 Exchange Place New York

STONE & WEBSTER
Incorporated
Design and Construction
Examinations Reports Appraisals
Industrial and Public Service Properties
NEW YORK BOSTON CHICAGO

THE BEELER ORGANIZATION
Transportation, Traffic, Operating Surveys
Better Service—Financial Reports
Appraisals—Management
52 Vanderbilt Ave. New York

SANDERSON & PORTER
ENGINEERS
PUBLIC UTILITIES & INDUSTRIALS
Design Construction Management
Examinations Reports Valuations
CHICAGO NEW YORK SAN FRANCISCO

ENGELHARDT W. HOLST
Consulting Engineers
Appraisals Reports Rates Service Investigation
Studies on Financial and Physical Rehabilitation
Reorganization Operation Management
683 Atlantic Ave., BOSTON, MASS.

ALBERT S. RICHEY
ELECTRIC RAILWAY ENGINEER
WORCESTER, MASSACHUSETTS
REPORTS - APPRAISALS - RATES - OPERATION - SERVICE

Byllesby Engineering & Management Corporation
231 S. La Salle Street, Chicago
New York San Francisco

C. B. BUCHANAN, President — W. H. PRICE, JR., Sec'y-Treas. — JOHN F. LAYNG, Vice-President
BUCHANAN & LAYNG CORPORATION
Engineering and Management, Construction
Financial Reports, Traffic Surveys
and Equipment Maintenance
BALTIMORE, 1004 Citizens National Bank Bldg. — Phone: Hanover: 2142 — NEW YORK, 49 Wall Street

DAY & ZIMMERMANN, INC.
ENGINEERS
DESIGN - CONSTRUCTION - REPORTS
VALUATIONS - MANAGEMENT
NEW YORK PHILADELPHIA CHICAGO

HEMPHILL & WELLS
CONSULTING ENGINEERS
Gardner F. Wells Albert W. Hemphill
APPRAISALS
INVESTIGATIONS COVERING
Reorganization Management Operation Construction
43 Cedar Street, New York City

STEVENS & WOOD
INCORPORATED
ENGINEERS AND CONSTRUCTORS
120 BROADWAY, NEW YORK
ENGINEERING CONSTRUCTION — YOUNGSTOWN, O. — FINANCING MANAGEMENT

KELKER, DELEUW & CO.
CONSULTING ENGINEERS
REPORTS ON
Operating Problems Valuations Traffic Surveys
111 W. Washington Street, Chicago, Ill.

McCLELLAN & JUNKERSFELD
Incorporated
ENGINEERING AND CONSTRUCTION
Examinations—Reports—Valuations
Transportation Problems—Power Developments
68 Trinity Place, New York
Chicago St. Louis

E. H. FAILE & CO.
Designers of
Garages— Service Buildings—Terminals
441 LEXINGTON AVE. NEW YORK

WALTER JACKSON
Consultant on Fares and Motor Buses
The Weekly and Sunday Pass—Differential Fares—Ride Selling
Holbrook Hall 5-W-3
160 Gramatan Ave., Mt. Vernon, N. Y.

THE BABCOCK & WILCOX COMPANY

85 Liberty Street, New York

Builders since 1868 of Water Tube Boilers of continuing reliability

BRANCH OFFICES

Boston, 80 Federal Street
Philadelphia, Packard Building
Pittsburgh, Farmers Deposit Bank Building
Cleveland, Guardian Building
Chicago, Marquette Building
Cincinnati, Traction Building
Atlanta, Candler Building
Phoenix, Ariz., Heard Building
Dallas, Tex., Magnolia Building
Honolulu, H. T., Castle & Cooke Building
Portland, Ore., Gasco Building

WORKS
Bayonne, N. J.
Barberton, Ohio

Makers of Steam Superheaters since 1898 and of Chain Grate Stokers since 1893

BRANCH OFFICES

Detroit, Ford Building
New Orleans, 344 Camp Street
Houston, Texas, Electric Building
Denver, 444 Seventeenth Street
Salt Lake City, Kearns Building
San Francisco, Sheldon Building
Los Angeles, Central Building
Seattle, L. C. Smith Building
Havana, Cuba, Calle de Aguiar 104
San Juan, Porto Rico, Royal Bank Building

THE P. EDWARD WISH SERVICE

50 Church St. NEW YORK — *Street Railway Inspection* DETECTIVES — 131 State St. BOSTON

Hale and Kilburn SEATS

Better Quality Seats For Cars and Buses

Hale-Kilburn Co.
1800 Lehigh Ave., Philadelphia, Pa.

UNA RAIL JOINTS
DYNAMOTORS
WELDING ROD
UNA Welding & Bonding Co.
Cleveland, Ohio.

RAIL GRINDERS AND WELDERS

Railway Track-work Co., Philadelphia

682

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

ILLINOIS MOTIVE EQUIPMENT COMPANY

J. D. Elsom, President

General Sales Agent—The Air Rectifier
District Representatives
Johnson Fare Box; McCloskey Bomb Shell Torch;
Cinch Vertical Swipe; Fyr-Fly Spot Light

35 E. Wacker Drive Chicago, Illinois

Hubbard and COMPANY
PITTSBURGH OAKLAND CHICAGO

INDUSTRIAL GASES

ACETYLENE OXYGEN — I.O.C. SYSTEM — HYDROGEN NITROGEN

Quick shipment and low prices also on cylinders, valves, torches, regulators and supplies.

International Oxygen Co., Main Offices: Newark, N. J.
Branches: New York Pittsburgh Toledo

PS HEATERS

Car Heating and Ventilating

—are no longer operating problems. We can show you how to take care of both with one equipment. The Peter Smith Forced Ventilation Hot Air Heater will save, in addition, 40% to 60% of the cost of any other car heating and ventilating system. Write for details.

The Peter Smith Heater Company
6209 Hamilton Ave., Detroit, Mich.



Boyerized Parts:

Brake Pins
Brake Hangers
Brake Levers
Pedestal Gibs
Brake Fulcrums
Turnbuckles
Center Bearings
Side Bearings
Spring Post Bushings
Spring Posts
Bolster and Transom Chafing Plates
Manganese Brake Heads
Manganese Truck Parts
Bushings
Bronze Bearings
McArthur Turnbuckles

Can be purchased through the following representatives:

Economy Electric Devices Co.
72 W. Van Buren St., Chicago, Ill.
F. F. Bodler,
903 Monadnock Bldg., San Francisco, Cal.
W. F. McKenney,
54 First Street, Portland, Oregon.
J. H. Denton,
1328 Broadway, New York City, N. Y.
A. W. Arlin,
519 Delta Bldg., Los Angeles, Cal.

Bemis Car Truck Company
Springfield, Mass.

TULC A LUBRICANT

We make a specialty of
ELECTRIC RAILWAY LUBRICATION
We solicit a test of TULC on your equipment
The Universal Lubricating Co.
Cleveland, Ohio
Chicago Representatives: Jameson-Ross Company, Straus Bldg.

COLUMBIA

Railway Supplies and Equipment

Machine and
Sheet Metal Work

Forgings
Special Machinery
and Patterns

Grey Iron and
Brass Castings

Armature and
Field Coils.

The Columbia Machine Works *and M. I. Co.*
265 Chestnut St., corner Atlantic Ave.,
Brooklyn, New York

STANDARD
STEEL PRODUCTS

Steel Axles Steel Springs
Armature Shafts
Rolled Steel Wheels

STANDARD STEEL WORKS COMPANY
PHILADELPHIA, PA.
BRANCH OFFICES
CHICAGO NEW YORK PORTLAND SAN FRANCISCO ST LOUIS
PITTSBURGH HOUSTON RICHMOND ST. PAUL MEXICO CITY
WORKS, BURNHAM, PA.



JOHNSON
FARE
COLLECTING
SYSTEMS

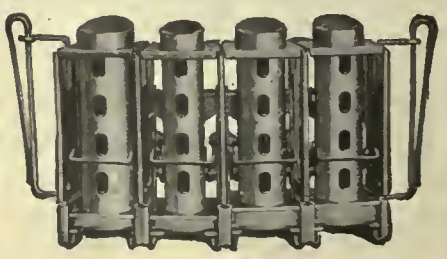


Johnson Electric Fare Boxes and overhead registers make possible the instantaneous registering and counting of every fare. Revenues are increased 1½ to 5% and the efficiency of one-man operation is materially increased. Over 4000 already in use.

When more than two coins are used as fare, the Type D Johnson Fare Box is the best manually operated registration system. Over 50,000 in use.

Johnson Change-Makers are designed to function with odd fare and metal tickets selling at fractional rates It is possible to use each barrel separately or in groups to meet local conditions. Each barrel can be adjusted to eject from one to five coins or one to six tickets.





Johnson Fare Box Co.
4619 Ravenswood Ave., Chicago, Ill.

PRETTYMAN PRESERVED
P27
FOREST PRODUCTS

Tougher Ties - - -

The added elasticity and everlasting toughness of Prettyman Creosote Preserved ties warrant their use to the exclusion of all others.

They are available in any quantities, anywhere, any time.

CREOSOTED

Sub-flooring; Construction Timbers, Lumber; Piling; Poles; Posts and other Forest Products

SALES OFFICES

BOSTON—Chamber of Commerce Bldg.
NEW YORK—350 Madison Ave.
BALTIMORE—Fidelity Bldg.

J. F. Prettyman & Sons
Wood Preserving Plant
Charleston, S. C.

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.

Positions Vacant and all other classifications, 8 cents a word, minimum charge $2.00.

Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.

Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

1 to 3 inches.....$4.50 an inch
4 to 7 inches..... 4.30 an inch
8 to 14 inches..... 4.10 an inch

Rates for larger spaces, or yearly rates, on request.

An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

Make your used equipment help cut the cost of replacements!

¶ Used Railway Equipment—cars, rails, poles, appliances, road building equipment, etc.—that you consider of no further value in your service, may just fit the need and purpose of some other organization in the field of electric railway operation.

¶ There's always a market for used railway equipment somewhere. Don't make the mistake of junking equipment that you consider of no value, when there's a possibility of turning it into cash to be applied against the cost of replacements—that's not good business. Send us a list of the equipment you wish to dispose of to be advertised here. Over 6,000 executives and officials in the electric railway field watch the Searchlight Section for opportunities to purchase used equipment.

Advertise it in the—

SEARCHLIGHT SECTION

POSITIONS WANTED

EXECUTIVE—Fifteen years' experience managing light, power and transportation properties. Open for other connections; personal reasons for desiring change. PW-69, Electric Railway Journal, Guardian Bldg., Cleveland, Ohio.

GENERAL superintendent or manager; fifteen years' successful experience. PW-55, Electric Railway Journal, Tenth Ave. at 36th St., New York.

SUPERINTENDENT, fifteen years' experience in city, interurban and bus transportation in foreign countries and United States; can speak Spanish. PW-68, Electric Railway Journal, Tenth Avenue at 36th St., New York.

SUPERINTENDENT equipment, M. M. efficiency; work unit cost production appointment wanted; highest personal references; 25 years' experience steam electric, stores; wide bus experience in London and U. S. A. and public relations; willing to go anywhere. PW-70, Electric Railway Journal, Tenth Ave. at 36th St., New York.

SUPERINTENDENT of transportation, ten years' experience in high speed interurban and city operation, desires position in the South. Best of references. PW-72, Electric Railway Journal, Tenth Ave. at 36th St., New York.

YOUNG man, 31, excellent health and personal habits, open for position of executive nature or capacity affording opportunity of advancement. 9 years' experience street railway service with progressive property operating modern trolley cars and buses. Equipped to act in secretarial capacity. Will go anywhere and services available immediately, if necessary. PW-71, Electric Railway Journal, Tenth Ave. at 36th St., New York.

FOR SALE

15 BIRNEY SAFETY CARS

Brill Built
West. 508 or G. E. 264 Motors
Cars Complete—Low Price—Fine Condition
ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

TO HELP YOU

LOCATE SELLING OPPORTUNITIES

"Searchlight" Advertising

We buy entire Railways and Power Plants

H. E. SALZBERG COMPANY, Inc.
225 Broadway New York City

We sell Street Railway and Power equipment

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Brakes
General Electric Co.
Westinghouse Air Brake Co.

Anchors, Guy
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Armature Shop Tools
Columbia Machine Works
Elec. Service Supplies Co.

Automatic Return Switch Stands
Ramapo Ajax Corp.

Automatic Safety Switch Stands
Ramapo Ajax Corp.

Axles
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Cincinnati Car Co.
Illinois Steel Co.
St. Louis Car Co.
Standard Steel Works
Westinghouse E. & M. Co.

Babbitting Devices
Columbia Machine Works & M. I. Co.

Badges and Buttons
Elec. Service Supplies Co.
International Register Co.

Barges, Steel
American Bridge Co.

Batteries, Dry
Nichols-Lintern Co.

Bearings and Bearing Metals
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
St. Louis Car Co.
Westinghouse E. & M. Co.

Bearings, Center and Roller Side
Cincinnati Car Co.
Columbia Machine Works
Stucki Co., A.

Bearings, Roller
Timken Roller Bearing Co.

Bells and Buzzers
Consolidated Car Heating Co.

Bells and Gongs
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
St. Louis Car Co.

Benders, Rail
Railway Trackwork Co.

Body Material, Haskelite Plymetl
Haskelite Mfg. Corp.

Bodies, Bus
Brill Co., The J. G.
Cummings Car & Coach Co.
St. Louis Car Co.

Boilers
Babcock & Wilcox Co.

Bolts & Nuts, Track
Illinois Steel Co.

Bond Testers
American Steel & Wire Co.
Electric Service Supplies Co.

Bonding Apparatus
American Steel & Wire Co.
Electric Railway Improvement Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.

Bonds, Rail
American Steel & Wire Co.
Electric Railway Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, etc.)
American Bridge Co.
Bates Expanded Steel Truss Co.
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Brill Co., The J. G.
Cincinnati Car Co.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
Bemis Car Truck Co.
Brill Co., The J. G.
St. Louis Car Co.
Taylor Electric Truck Co.

Brake Testers
National Ry. Appliance Co.

Brakes, Brake Systems and Brake Parts
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
General Electric Co.
National Brake Co.
St. Louis Car Co.
Westinghouse Tr. Br. Co.

Brakes, Magnetic Rail
Cincinnati Car Co.

Bridges, Steel
American Bridge Co.

Brushes, Carbon
General Electric Co.
Morganite Brush Co., Inc.
Westinghouse E. & M. Co.

Brushes, Graphite
Morganite Brush Co., Inc.

Brushholders
Columbia Machine Works
General Electric Co.

Bulkheads
Haskelite Mfg. Corp.

Buildings, Steel
American Bridge Co.

Bunkers, Coal
American Bridge Co.

Buses
Cummings Car & Coach Co.
General Electric Co.

Bus Lighting
National Ry. Appliance Co.

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works
St. Louis Car Co.

Cables (See Wires and Cables)

Cambric Tapes, Yellow and Black Varnish
General Electric Co.
Irvington Varnish & Ins. Co.
Mica Insulator Co.

Carbon Brushes (See Brushes, Carbon)

Car Lighting Fixtures
Elec. Service Supplies Co.

Car Panel Safety Switches
Consolidated Car Heating Co.
Westinghouse E. & M. Co.

Car Steps, Safety
Cincinnati Car Co.

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Cars, Dump
Brill Co., The J. G.
Differential Steel Car Co.
St. Louis Car Co.

Cars, Gas-Electric
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co.

Cars, Gas, Rail
Brill Co., The J. G.
St. Louis Car Co.

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Cincinnati Car Co.
Cummings Car & Coach Co.
Kuhlman Car Co., G. C.
St. Louis Car Co.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Cars, Self-Propelled
Brill Co., The J. G.

Castings, Brass Composition or Copper
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.

Castings, Gray Iron and Steel
American Bridge Co.
American Steel Foundries
Bemis Car Truck Co.
Columbia Machine Works & M. I. Co.
St. Louis Car Co.
Standard Steel Works

Castings, Malleable & Brass
Bemis Car Truck Co.
Columbia Machine Works & M. I. Co.
St. Louis Car Co.

Catchers and Retrievers, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.

Ceiling Car
Haskelite Mfg. Corp.

Ceilings Plywood Panels
Haskelite Mfg. Corp.

Chairs, Parlor Car
Heywood Wakefield Co.

Change Carriers
Cleveland Fare Box Co.
Electric Service Supplies Co.

Change Trays
Cincinnati Car Co.

Circuit-Breakers
General Electric Co.
Westinghouse E. & M. Co.

Clamps and Connectors for Wires and Cables
Columbia Machine Works
Electric Railway Improvement Co.
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Cleaners and Scrapers Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
Long Mfg. Co.

Coil Banding and Winding Machines
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

Coils, Armature and Field
Columbia Machine Works & M. I. Co.
General Electric Co.
Westinghouse E. & M. Co.

Coils, Choke and Kicking
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Coin Changers
Illinois Motive Equip. Co.
Johnson Fare Box Co.

Coin Counting Machines
Cleveland Fare Box Co.
International Register Co.
Johnson Fare Box Co.

Coin Sorting Machines
Cleveland Fare Box Co.
Johnson Fare Box Co.

Coin Wrappers
Cleveland Fare Box Co.

Commutator Slotters
Columbia Machine Works
Elec. Service Supplies Co.
Westinghouse E. & M. Co.
Wood Co., Chas. N.

Commutators or Parts
Columbia Machine Works & M. I. Co.
General Electric Co.
Westinghouse E. & M. Co.

Compressors, Air
General Electric Co.
Westinghouse Tr. Br. Co.

Condensers
General Electric Co.
Westinghouse E. & M. Co.

Condensor Papers
Irvington Varnish & Ins. Co.

Connectors, Solderless
Westinghouse E. & M. Co.

Connectors, Trailer Car
Columbia Machine Works
Consolidated Car Heating Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Controllers or Parts
Columbia Machine Works & M. I. Co.
General Electric Co.
Westinghouse E. & M. Co.

Controller Regulators
Elec. Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse E. & M. Co.

Converters, Rotary
General Electric Co.
Westinghouse E. & M. Co.

Conveying and Hoisting Machinery
American Bridge Co.

Copper Wire
American Brass Co.
American Steel & Wire Co.
Anaconda Copper Mining Co.

Copper Wire Instruments, Measuring, Testing and Recording
American Brass Co.
Anaconda Copper Mining Co.

Cord, Bell, Trolley, Register
American Steel & Wire Co.
Brill Co., The J. G.
Elec. Service Supplies Co.
International Register Co.
Roebling's Sons Co., John A.
St. Louis Car Co.
Samson Cordage Works

Cord Connectors and Couplers
Elec. Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
American Steel Foundries
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
Ohio Brass Co.
Westinghouse Traction Brake Co.

Cowl Ventilators
Nichols-Lintern Co.

Cranes, Hoists & Lifts
Electric Service Supplies Co.

Cross Arms (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossings
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Frogs & Switches
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Track (See Track Special Work)

Crossings, Trolley
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Curtains & Curtain Fixtures
Brill Co., The J. G.
St. Louis Car Co.

Cutting Apparatus
Electric Railway Improvement
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse Electrical & Mfg. Co.

Dealer's Machinery & Second Hand Equipment
Electric Equipment Co.
Salzberg, Inc., H. E.

Derailing Devices (See also Track Work)

Derailing Switches
Ramapo Ajax Corp.

Destination Signs
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.

Detective Service
Wish-Service, P. Edward

Door Operating Devices
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Heating Co.
National Pneumatic Co.

Doors & Door Fixtures
Brill Co., The J. G.
Cincinnati Car Co.
Hale-Kilburn Co.
St. Louis Car Co.

Doors, Folding Vestibule
National Pneumatic Co.

Drills, Track
American Steel & Wire Co.
Electric Service Supplies Co.
Ohio Brass Co.

Dryers, Sand
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Ears
Columbia Machine Works & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Electric Grinders
Railway Trackwork Co.

Electric Rivet Heaters
American Car & Fdry. Co.

Electric Transmission Towers
American Bridge Co.

Electrical Wires and Cables
Amer. Electrical Works.
American Steel & Wire Co.
John A. Roebling's Sons Co.

Electrodes, Carbon
Railway Trackwork Co.
Una Welding & Bonding Co.

Electrodes, Steel
Railway Trackwork Co.
Una Welding & Bonding Co.

Enamel
Du Pont de Nemours & Co., E. I.

Engineers, Consulting, Contracting and Operating
Beeler, John A.
Byllesby Co., H. M.
Day & Zimmermann, Inc.
Faile & Co., E. H.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & DeLeuw
McClellan & Junkersfeld
Richey, Albert S.
Sanderson & Porter
Stevens & Wood
Stone & Webster Co.
White Eng. Corp., The J. G.

Engines, Gas, Oil or Steam
Westinghouse E. & M. Co.

Exterior Side Panels
Haskelite Mfg. Corp.

Fare Boxes
Cleveland Fare Box Co.
Illinois Motive Equip. Co.
Johnson Fare Box Co.
Perey Mfg. Co.

Fare Registers
Electric Service Supplies Co.
Johnson Fare Box Co.

Fences, Woven Wire & Fence Posts
American Steel & Wire Co.

Fenders and Wheel Guards
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Fender Co.
St. Louis Car Co.
Star Brass Works
Wood Co., Chas. N.

Fibre and Fibre Tubing
Westinghouse E. & M. Co.

Field Coils (See Coils)

Floodlights
Electric Service Supplies Co.
General Electric Co.

Floor, Sub
Haskelite Mfg. Corp.

Floors
Haskelite Mfg. Corp.

Forgings
Brill Co., The J. G.
Cincinnati Car Co.
Standard Steel Works

Frogs & Crossings, Tee Rail
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Frogs, Track (See Track Work)

Frogs, Trolley
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Furnaces, Electric, Steel Melting
American Bridge Co.

Fuses and Fuse Boxes
Columbia Machine Works & M. I. Co.
Consolidated Car Heating Co.
General Electric Co.
Westinghouse E. & M. Co.

Gas Electric Drive for Buses
General Electric Co.

Gaskets
Westinghouse Tr. Br. Co.

(Continued on page 32)

AMERICAN BRIDGE COMPANY

EMPIRE BUILDING—71 BROADWAY NEW YORK, N. Y.

Manufacturers of Steel Structures of all classes particularly BRIDGES AND BUILDINGS

ALSO STEEL BARGES FOR HARBORS AND RIVERS, STEEL TOWERS FOR ELECTRIC TRANSMISSION, HEROULT ELECTRIC FURNACES, ETC.

SALES OFFICES:

NEW YORK, N. Y. — Philadelphia, Pa. — Boston, Mass. — Baltimore, Md.
PITTSBURGH, PA. — Cincinnati, Ohio — Cleveland, Ohio — Detroit, Mich.
CHICAGO, ILL. — St. Louis, Mo. — Denver, Colo. — Salt Lake City, Utah — Duluth, Minn. — Minneapolis, Minn.

Pacific Coast Representative: U. S. Steel Products Co., Pacific Coast Dept. — San Francisco, Cal. — Los Angeles, Cal. — Portland, Ore. — Seattle, Wash.

Export Representative: United States Steel Products Co., 30 Church Street, New York.

SPECIAL TRACKWORK
of the famous
TISCO MANGANESE STEEL

WM. WHARTON JR. & CO., INC.
EASTON, PA.

Sales Offices:
Boston Chicago El Paso Montreal New York Philadelphia Pittsburgh San Francisco Scranton

B. A. HEGEMAN, Jr., President — H. A. HEGEMAN, First Vice-Pres. and Treas.
F. T. SARGENT, Secretary — W. C. PETERS, Vice-Pres. Sales and Engineering

National Railway Appliance Co.
Graybar Building, 420 Lexington Ave., New York

BRANCH OFFICES
Munsey Bldg., Washington, D. C. — 100 Boylston St., Boston, Mass.
Hegeman-Castle Corporation, Railway Exchange Building, Chicago, Ill.

RAILWAY SUPPLIES

Tool Steel Gears and Pinions
Anglo-American Varnish Co., Varnishes, Enamels, etc.
National Hand Holds
Genesco Paint Oils
Dunham Hopper Door Device
Garland Ventilators
Walter Tractor Snow Plows
Feasible Drop Brake Staffs
Ft. Pitt Spring & Mfg. Co., Springs
Flaxlinum Insulation
Economy Electric Devices Co. Power Saving and Inspection Meters
National Safety Devices Company's Whistle Blowers, Gong Ringers and Brake Hangers
Godward Gas Generators
Cowdry Automotive Brake Testing Machine

THE WORLD'S STANDARD
"IRVINGTON"
Black Varnished Silk, and Yellow Varnished Cambric, Yellow Varnished Paper
Irv-O-Slot Insulation
Flexible Varnished Tubing
Insulating Varnishes and Compounds

Irvington Varnish & Insulator Co.
Irvington, N. J.

Sales Representatives:
Mitchell-Rand Mfg. Co., N. Y.
E. M. Wolcott, Rochester
I. W. Levine, Montreal
A. L. Gillies, Toronto
Prehler Brothers Inc., Chicago
White Supply Co., St. Louis
Clapp & LaMoree, Los Angeles
Martin Woodard, Seattle
Consumers' Rubber Co., Cleveland

Lorain Special Trackwork Girder Rails

Electrically Welded Joints

THE LORAIN STEEL COMPANY
Johnstown, Pa.

Sales Offices:
Atlanta Chicago Cleveland New York Philadelphia Pittsburgh Dallas

Pacific Coast Representative:
United States Steel Products Company
Los Angeles Portland San Francisco Seattle

Export Representative:
United States Steel Products Company, New York, N. Y.

Kalamazoo Trolley Wheels

The value of Kalamazoo Trolley Wheels and Harps has been demonstrated by large and small electric railway systems for a period of thirty years. Being exclusive manufacturers, with no other lines to maintain, it is through the high quality of our product that we merit the large patronage we now enjoy. With the assurance that you pay no premium for quality we will appreciate your inquiries.



THE STAR BRASS WORKS
KALAMAZOO, MICH., U. S. A.

Bethlehem Products for Electric Railways

Tee and Girder Rails; Machine Fitted Joints; Splice Bars; Hard Center Frogs; Hard Center Mates; Rolled Alloy Steel Crossings; Abbott and Center Rib Base Plates; Rolled Steel Wheels and Forged Axles; Tie Rods; Bolts; Tie Plates and Pole Line Material.

Catalog Sent on Request

BETHLEHEM STEEL COMPANY, Bethlehem, Pa.

BETHLEHEM

Gas Producers
Westinghouse E. & M. Co.

Gates, Car
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.

Gear Blanks
Brill Co., The J. G.
Standard Steel Works

Gear Cases
Chillingworth Mfg. Co.
Columbia Machine Works & M. I. Co.
Electric Service Supplies Co
Westinghouse E. & M. Co.

Gears and Pinions
Bemis Car Truck Co.
Columbia Machine Works & M. I. Co.
Electric Service Supplies Co
General Electric Co.
Nat'l Ry. Appliance Co.
R. D. Nuttall Co.
Tool Steel Gear & Pinion Co.

Generators
General Electric Co.
Westinghouse E. & M. Co.

Girder Rails
Bethlehem Steel Co.
Lorain Steel Co.

Gongs (See Bells and Gongs)

Greases (See Lubricants)

Grinders, Portable
Railway Trackwork Co.

Grinders, Portable Electric
Railway Trackwork Co.

Grinding Bricks and Wheels
Railway Trackwork Co.

Guard Rail Clamps
Ramapo Ajax Corp.

Guard Rails, Tee Rail & Manganese
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Guards, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.

Harps, Trolley
Columbia Machine Works
Elec. Service Supplies Co.
R. D. Nuttall Co.
Star Brass Works

Headlights
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

Headlining
Columbia Machine Works & M. I. Co.
Haskelite Mfg. Corp.

Heaters, Bus
Nichols-Lintern Co.

Heaters, Car (Electric)
Consolidated Car Heating Co.
Gold Car Heat. & Ltg. Co.
Railway Utility Co.
Smith Heater Co., Peter

Heaters, Car, Hot Air and Water
Smith Heater Co., Peter

Heaters, Car Stove
Smith Heater Co., Peter

Heaters, Electric Rivet
American Car & Fdry. Co.

Helmets, Welding
Railway Trackwork Co.
Una Welding & Bonding Co.

Hoists & Lifts
Columbia Machine Works & M. I. Co.

Hose, Bridges
Ohio Brass Co.

Hose, Pneumatic
Westinghouse Traction Brake Co.

Instruments, Measuring, Testing and Recording
American Steel & Wire Co.
General Electric Co.
National Ry. Appliance Co.
Westinghouse E. & M. Co.

Insulating Cloth, Paper and Tape
General Electric Co.
Irvington Varnish & Ins. Co.
Mica Insulator Co.
Okonite Co.
Okonite-Callender Cable Co.
Westinghouse E. & M. Co.

Insulating Silk
Irvington Varnish & Ins. Co.

Insulating Varnishes
E. I. Du Pont de Nemours Co.
Irvington Varnish & Ins. Co.

Insulation (See also Paints)
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
Irvington Varnish & Ins. Co.
Mica Insulator Co.
Okonite Co.
Okonite-Callender Cable Co.
Westinghouse E. & M. Co.

Insulation Slots
Irvington Varnish & Ins. Co.

Insulator Pins
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Insulators (See also Line Materials)
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Interior Side Linings
Haskelite Mfg. Corp.

Jacks (See also Cranes, Hoists and Lifts)
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.

Joints, Rail
(See Rail Joints)

Journal Boxes
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.

Lacquer
Du Pont de Nemours & Co., E. I.

Lamp Guards and Fixtures
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

Lamps, Arc & Incandescent (See also Headlights)
General Electric Co.
Westinghouse E. & M. Co.

Lamps, Signal and Marker
Elec. Service Supplies Co.
Nichols-Lintern Co.

Lanterns, Classification
Nichols-Lintern Co.

Letter Boards
Cincinnati Car Co.
Haskelite Mfg. Corp.

Lighting Fixtures, Interior
Electric Service Supplies Co.

Lightning Protection
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Line Material (See also Brackets, Insulators, Wires, etc.)
Archbold-Brady Co.
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Locking Spring Boxes
Wm. Wharton, Jr. & Co.

Locomotives, Electric
Cincinnati Car Co.
Cummings Car & Coach Co.
General Electric Co.
St. Louis Car Co.
Westinghouse E. & M. Co.

Lubricating Engineers
Universal Lubricating Co.

Lubricants, Oil and Grease
Universal Lubricating Co.

Manganese Parts
Bemis Car Truck Co.

Manganese Steel Guard Rails
Ramapo Ajax Corp.
Wm. Wharton Jr. & Co.

Manganese Steel, Special Track Work
Bethlehem Steel Co.
Wm. Wharton, Jr. & Co.

Manganese Steel Switches, Frogs and Crossings
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Meters (See Instruments)

Mica
Mica Insulator Co.

Mirrors, Inside & Outside
Cincinnati Car Co.

Motor Buses (See Buses)

Motors, Electric
General Electric Co.
Westinghouse E. & M. Co.

Motor, Generators & Controls for Electric Buses
General Electric Co.

Motorman's Seats
Brill Co., The J. G.
Cincinnati Car Co.
Elec. Service Supplies Co.
Heywood Wakefield Co.
St. Louis Car Co.
Wood Co., Chas. N.

Nuts and Bolts
Bemis Car Truck Co.
Cincinnati Car Co.
Hubbard & Co.

Oils (See Lubricants)

Omnibuses (See Buses)

Oxy-Acetylene (See Cutting Apparatus)

Oxygen
International Oxygen

Packing
Westinghouse Traction Brake Co.

Paints and Varnishes (Insulating)
Elec. Service Supplies Co.
Irvington Varnish & Ins. Co.

Paints & Varnishes, Preservative
E. I. Du Pont de Nemours Co.

Paints & Varnishes, Railway
E. I. Du Pont de Nemours Co.
National Ry. Appliance Co.

Panels, Outside, Inside
Haskelite Mfg. Corp.

Pickup, Trolley Wire
Elec. Service Supplies Co.
Ohio Brass Co.

Pinion Pullers
Elec. Service Supplies Co.
Wood Co., Chas. N.

Pinions (See Gears)

Pins, Case Hardened, Wood and Iron
Ohio Brass Co.
Westinghouse Traction Brake Co.

Pipe Fittings
Standard Steel Works
Westinghouse Tr. Brake Co.

Planers (See Machine Tools)

Plates for Tee Rail Switches
Ramapo Ajax Corp.

Pliers, Rubber Insulated
Elec. Service Supplies Co.

Plywood Roofs, Headlinings, Floors, Interior Panels, Bulkheads, Truss Planks
Haskelite Mfg. Corp.

Pole Line Hardware
Bethlehem Steel Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.

Pole Reinforcing
Hubbard & Co.

Poles, Metal Street
Bates Expanded Steel Truss Co.
Elec. Ry. Equipment Co.
Hubbard & Co.

Poles, Ties, Posts, Piling & Lumber
Bell Lumber Co.
Naugle Pole & Tie Co.
J. F. Prettyman & Son

Poles and Ties, Treated
Bell Lumber Co.
J. F. Prettyman & Son

Poles, Trolley
Elec. Service Supplies Co.
R. D. Nuttall Co.

Poles, Tubular Steel
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.

Portable Grinders
Railway Trackwork Co.

Potheads
Okonite Co.
Okonite-Callender Cable Co., Inc.

Power Houses
American Bridge Co.

Power Saving Devices
National Ry. Appliance Co.

Pressings, Special Steel
Cincinnati Car Co.

Pressure Regulators
General Electric Co.
Westinghouse E. & M. Co.
Westinghouse Traction Brake Co.

Punches, Ticket
International Register Co.
Wood Co., Chas. N.

Pyroxylin Finishes
Du Pont de Nemours & Co., E. I.

Rail Braces and Fastenings
Ramapo Ajax Corp.

Rail Grinders (See Grinders)

Rail Joints
Carnegie Steel Co.
Illinois Steel Co.
Rail Joint Co.

Rail Joints, Welded
Lorain Steel Co.

Rail Welding
Railway Trackwork Co.
Una Welding & Bonding Co.

Rails, Steel
Carnegie Steel Co.
Illinois Steel Co.

Railway Safety Switches
Consolidated Car Heating Co.
Westinghouse E. & M. Co.

Rattan
Brill Co., The J. G.
Cummings Car & Coach Co.
Elec. Service Supplies Co.
Hale-Kilburn Co.
Heywood Wakefield Co.
St. Louis Car Co.

Registers and Fittings
Brill Co., The J. G.
Cincinnati Car Co.
Elec. Service Supplies Co.
International Register Co.
St. Louis Car Co.

Reinforcement, Concrete
American Steel & Wire Co.
Bethlehem Steel Co.
Carnegie Steel Co.

Repair Shop Appliances (See also Coil Banding and Winding Machines)
Elec. Service Supplies Co.

Repair Work (See also Coils)
Westinghouse E. & M. Co.

Replacers, Car
Cincinnati Car Co.
Elec. Service Supplies Co.

Resistances
Consolidated Car Heating Co.
General Electric Co.

Resistance, Wire and Tube
Westinghouse E. & M. Co.

Retrievers, Trolley (See Catchers and Retrievers Trolley)

Rheostats
General Electric Co.
Westinghouse E. & M. Co.

Rivet Heaters, Electric
American Car & Fdry. Co.

Roofing, Car
Haskelite Mfg. Corp.

Roofs, Car and Bus
Haskelite Mfg. Corp.

Sanders, Track
Brill Co., The J. G.
Elec. Service Supplies Co.
Nichols-Lintern Co.
Ohio Brass Co.
St. Louis Car Co.

Sash Fixtures, Car
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.

Sash, Metal Car Window
Hale-Kilburn Co.

Scrapers, Track (See Cleaners and Scrapers, Track)

Screw Drivers, Rubber Insulated
Elec. Service Supplies Co.

Seating Materials
Brill Co., The J. G.
Haskelite Mfg. Corp.
Heywood Wakefield Co.
St. Louis Car Co.

Seats, Bus
Brill Co., The J. G.
Hale-Kilburn Co.
Heywood Wakefield Co.
St. Louis Car Co.

Seats, Car (See also Rattan)
Brill Co., The J. G.
Cincinnati Car Co.
Hale-Kilburn Co.
Heywood Wakefield Co.
St. Louis Car Co.

Second Hand Equipment
Electric Equipment Co.
Salzberg, Inc., H. E.

Shades, Vestibule
Brill Co., The J. G.
Cincinnati Car Co.

Shovels
Brill Co., The J. G.
Hubbard & Co.

Shovels, Power
Brill Co., The J. G.

Side Bearings (See Bearings Center and Side)

Signals, Car Starting
Consolidated Car Heating Co.
Elec. Service Supplies Co.
National Pneumatic Co.

Signals, Indicating
Nichols-Lintern Co.

Signal Systems, Block
Elec. Service Supplies Co.
Nachod and United States Electric Signal Co.
Wood Co., Chas. N.

Signal Systems, Highway Crossing
Nachod and United States Electric Signal Co.
Wood Co., Chas. N.

Slack Adjusters (See Brake Adjusters)

Sleet Wheels and Cutters
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
Electric Railway Improvement Co.
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
R. D. Nuttall Co.

Smokestacks, Car
Nichols-Lintern Co.

Snow Plows
National Ry. Appliance Co.

Snow-Plows, Sweepers and Brooms
Brill Co., The J. G.
Columbia Machine Works & M. I. Co.
Consolidated Car Fender Co.
Cummings Car & Coach Co.
St. Louis Car Co.

Snow Sweeper, Rattan
J. G. Brill Co.
Heywood Wakefield Co.

Soldering and Brazing Apparatus (See Welding Processes and Apparatus)

Special Adhesive Papers
Irvington Varnish & Ins. Co.

Special Trackwork
Bethlehem Steel Co.
Lorain Steel Co.
Wm. Wharton, Jr. & Co.

Spikes
American Steel & Wire Co.
Illinois Steel Co.

Splicing Compounds
Westinghouse E. & M. Co.

Splicing Sleeves (See Clamps and Connectors)

Springs
National Ry. Appliance Co.

Springs, Car and Truck
American Spiral Spring Co.
American Steel Foundries
American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
Standard Steel Works

Sprinklers, Track and Road
Brill Co., The J. G.
Cummings Car & Coach Co.
St. Louis Car Co.

Steel and Steel Products
American Steel & Wire Co.
Carnegie Steel Co.
Illinois Steel Co.

Steps, Car
Brill Co., The J. G.
Cincinnati Car Co.

Stokers, Mechanical
Babcock & Wilcox Co.
Westinghouse E. & M. Co.

Stop Signals
Nichols-Lintern Co.

Storage Batteries (See Batteries, Storage)

Strain Insulators
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Strand
American Steel & Wire Co.
Roebling's Sons Co., J. A.

Street Cars (See Cars, Passenger, Freight, Express)
Cummings Car & Coach Co.

Superheaters
Babcock & Wilcox Co.

Sweepers, Snow (See Snow Plows, Sweepers and Brooms)

Switches
General Electric Co.

Switch Stands and Fixtures
Ramapo-Ajax Corp.

Switches, Selector
Nichols-Lintern Co.

Switches and Switchboards
Consolidated Car Heating Co.
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

Switches, Tee Rail
Ramapo-Ajax Corp.

Switches, Track (See Track Special Work

Tampers, Tie
Railway Trackwork Co.

Tapes and Cloths (See Insulating Cloth, Paper and Tape)

Tee Rail Special Track Work
Ramapo-Ajax Corp.

Telephones and Parts
Elec. Service Supplies Co.

Telephone & Telegraph Wire
American Steel & Wire Co.
John A. Roeblings Sons Co.

Testing Instruments (See Instruments, Measuring, Testing, etc.)

Thermostats
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter

(Continued on page 35)

Arc Weld Rail Bonds

AND ALL OTHER TYPES

Descriptive Catalogue Furnished

American Steel & Wire Company

New York · Boston · Pittsburgh
Chicago · Cleveland · Denver
U. S. Steel Products Co.
San Francisco · Los Angeles · Portland · Seattle

"The Standard for Rubber Insulation"

INSULATED WIRES and CABLES

"Okonite," "Manson," and Dundee "A" "B" Tapes

Send for Handbook

The Okonite Company
The Okonite-Callender Cable Company, Inc.

Factories, PASSAIC, N. J. PATERSON, N. J.

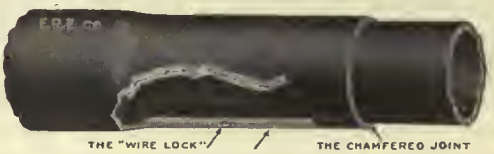
Sales Offices: New York Chicago Pittsburgh St. Louis Atlanta Birmingham San Francisco Los Angeles Seattle
Pettingell-Andrews Co., Boston, Mass.
F. D. Lawrence Electric Co., Cincinnati, O.
Novelty Electric Co., Phila., Pa.
Can. Rep.: Engineering Materials Limited, Montreal.
Cuban Rep.: Victor O. Mendoza Co., Havana.

NORTHERN **BELL** WESTERN
CEDAR POLES

BUTT TREATING ALL GRADES TIES

BELL LUMBER CO., *Minneapolis, Minn.*

ELRECO TUBULAR POLES



COMBINE

Lowest Cost · Lightest Weight
Least Maintenance · Greatest Adaptability

Catalog complete with engineering data sent on request.

ELECTRIC RAILWAY EQUIPMENT CO.
CINCINNATI, OHIO
New York City, 30 Church Street

ANACONDA from mine to consumer

Rod, Wire and Cable Products

ANACONDA COPPER MINING COMPANY
THE AMERICAN BRASS COMPANY
General Offices - - 25 Broadway, New York

ANACONDA TROLLEY WIRE

Efficient Bus Heating
with
The N-L Venti-Duct Heater

THE NICHOLS-LINTERN CO.
7960 Lorain Ave. Cleveland, Ohio

AMERICAN ELECTRICAL WORKS — AMELECTRIC — Wires and Cables — PHILLIPSDALE, R.I.

Reg. U. S. Pat. Office

AMELECTRIC PRODUCTS

BARE COPPER WIRE AND CABLE
TROLLEY WIRE
WEATHERPROOF WIRE AND CABLE
PAPER INSULATED UNDERGROUND CABLE
MAGNET WIRE

AMERICAN ELECTRICAL WORKS
PHILLIPSDALE, R. I.

Chicago, 20-32 West Randolph Street.
Cincinnati, Traction Bldg.: New York, 100 E. 42nd St.

NAUGLE POLES
WESTERN & NORTHERN CEDAR
NAUGLE POLE & TIE CO.
59 E. MADISON ST. CHICAGO ILL.
New York · Columbus · Kansas City · Spokane · Vancouver · Boston

---

Repetition is Reputation

ELECTRICAL WIRES and CABLES

ROEBLING

John A. Roebling's Sons Co., Trenton, N. J.

SAMSON SPOT WATERPROOFED TROLLEY CORD



Trade Mark Reg. U. S. Pat. Off.
Made of extra quality stock firmly braided and smoothly finished
Carefully inspected and guaranteed free from flaws.
Samples and information gladly sent.
SAMSON CORDAGE WORKS, BOSTON, MASS.



Gets Every Fare

PEREY TURNSTILES or PASSIMETERS

Use them in your Prepayment Areas and Street Cars

Perey Manufacturing Co., Inc.
101 Park Avenue, New York City

The DIFFERENTIAL CAR



Standard on 60 Railways for

Track Maintenance
Track Construction
Ash Disposal
Coal Hauling
Concrete Materials
Waste Handling
Excavated Materials
Hauling Cross Ties
Snow Disposal

Use These Labor Savers

Differential Crane Car
Clark Concrete Breaker
Differential 3-way Auto Truck Body
Differential Car Wheel Truck and Tractor

THE DIFFERENTIAL STEEL CAR CO., Findlay, O.

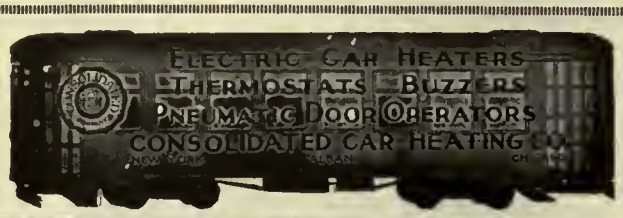


Type R-11
Double Register

International Registers

Made in single and double types to meet requirements of service. For hand or foot, mechanical or electric operation. Counters, car fittings, conductors' punches.

The International Register Co.
15 South Throop Street, Chicago, Illinois



"Bates Poles Outlive the Bond Issues that Buy Them"

BATES POLES AND STRUCTURES

Bates Expanded Steel Truss Co.

General Offices and Plants
EAST CHICAGO, INDIANA, U. S. A.

NACHOD & UNITED STATES SIGNAL CO., INC.

LOUISVILLE, KY.

BLOCK SIGNALS
FOR
ELECTRIC RAILWAYS
HIGHWAY CROSSING SIGNALS



RAILWAY UTILITY COMPANY

CAR COMFORT WITH
UTILITY
HEATERS
REGULATORS
VENTILATORS

2241-2247 Indiana St.
Chicago, Ill.

Write for Catalogue

1328 Broadway
New York, N. Y

GOLD CAR HEATING & LIGHTING CO.

220 36th St., Brooklyn, N. Y.

ELECTRIC HEATERS WITH OPEN COIL OR ENCLOSED ELEMENTS
THERMOSTAT CONTROL—VENTILATORS

WRITE FOR NEW CATALOGUE





STUCKI SIDE BEARINGS

A. STUCKI CO.
Oliver Bldg.
Pittsburgh, Pa.

H B LIFE GUARDS

PROVIDENCE FENDERS

Manufactured by
CONSOLIDATED CAR FENDER CO., PROVIDENCE, R. I.
General Sales Agents
WENDELL & MacDUFFIE CO., 110 E. 42nd St., N. Y. C.

Your Name
in this space in all issues where larger display space is not used backs up your advertising campaign and keeps your name in the classified section.



CHILLINGWORTH

One-Piece Gear Cases

Seamless—Rivetless—Light Weight
Best for Service — Durability and Economy. *Write Us.*

Chillingworth Mfg. Co.
Jersey City, N. J.

Chapman Automatic Signals

Charles N. Wood Co., Boston



Coin Counting and Sorting Machines

FARE BOXES

Lever-Operated and Slip Change Carriers

The Cleveland Fare Box Co.
Cleveland, Ohio
Canadian Cleveland Fare Box Co., Ltd., Preston, Ont.

ALPHABETICAL INDEX TO ADVERTISEMENTS

A

	Page
American Brass Co., The	33
American Bridge Co.	31
American Car Co...36, Third Cover	
American Electrical Works	33
American Steel & Wire Co.	4
Anaconda Copper Mining Co.	33

B

	Page
Babcock & Wilcox Co.	27
Bates Expanded Steel Truss Co.	34
Beeler Organization	26
Bell Lumber Co.	33
Bemis Car Truck Co.	27
Bethlehem Steel Co.	31
Brill Co., The J. G.36, Third Cover	
Buchanan & Layng Corp.	26
Budd Wheel Co.	10
Bylleaby Eng. & Management Corp.	26

C

	Page
Carnegie Steel Co.	24
Chillingworth Mfg. Co.	34
Cincinnati Car Co.	15
Cleveland Fare Box Co.	34
Collier, Inc., Barron G.	18
Columbia Machine Works, The.	28
Consolidated Car Fender Co.	34
Consolidated Car Heating Co.	34

D

	Page
Day & Zimmerman, Inc.	26
Differential Steel Car Co., The.	34
Du Pont de Nemours & Co., Inc., E. I.	23

E

	Page
Electric Equipment Co.	29
Electric Ry. Equipment Co.	33
Electric Ry. Improvement Co.	24
Electric Service Supplies Co.	7

F

	Page
Faile & Co., E. H.	26
Fisk Tire Co., The	8
Ford, Bacon & Davis	26
"For Sale" Ads	89

G

	Page
General Electrical Co.	20
Gold Car Heating & Lighting Co.	34
Goodyear Tire & Rubber Co., The 16-17	

H

	Page
Hale-Kilburn Co.	27
Haskelite Mfg. Corp....Back Cover	
"Help Wanted" Ads.	29
Hemphill & Wells.	26
Heywood-Wakefield Co.	19
Holst Englehardt W.	26
Hubbard & Co.	27

I

	Page
Illinois Motive Equipment Co.	27
Illinois Steel Co.	6
International Oxygen Co.	27
International Register Co.	34
International Steel Tie Co., The, Insert 11-12	
Irvington Varnish & Insulator Co.	31

J

	Page
Jackson, Walter	26
Johnson Fare Box Co.	28

K

	Page
Kelker, DeLeuw & Co.	26
Kuhlman Car Co...36, Third Cover	

L

	Page
Lorain Steel Co.	31

M

	Page
McClellan & Junkersfeld	26
Mica Insulator Co.	24
Morganite Brush Co., Inc.	25

N

	Page
Nachod and U. S. Signal Co.	34
National Brake Co., Inc.	21
National Pneumatic Co.	13
National Ry. Appliance Co.	31
Naugle Pole & Tie Co.	33
Nichols Lintern Co.	33
Nuttall Co., R. D.	25

O

	Page
Ohio Brass Co.	5
Okonite-Callender Cable Company, Inc., The	33
Okonite Co., The	33

P

	Page
Perey Mfg. Co., Inc.	33
Positions Wanted and Vacant.	20
Prettyman & Sons, J. F.	28

R

	Page
Railway Track-Work Co.	27
Railway Utility Co.	34
Ramapo Ajax Corp.	34
Richey, Albert	26
Roebling's Sons Co., John A.	33

S

	Page
St. Louis Car Co.	9
Salzberg Co., Inc., H. E.	29
Samson Cordage Works	33
Sanderson & Porter	26
Seachlight Section	29
Smith Heater Co., Peter	27
Standard Steel Works Co.	28
Star Brass Works	31
Stevens & Wood, Inc.	26
Stone & Webster	26
Stucki Co., A.	34

T

	Page
Timken Roller Bearing Co., Front Cover	

U

	Page
Una Welding & Bonding Co.	27
Universal Lubricating Co.	27

W

	Page
"Want" Ads	29
Wason Mfg. Co...36, Third Cover	
Westinghouse Elec. & Mfg. Co. Second Cover	
Westinghouse Traction Brake Co.	14
Wharton, Jr. & Co., Inc., Wm.	31
"What and Where to Buy,"	30, 32, 35
White Eng. Corp., The J. G.	26
Wish Service, The P. Edw.	27
Wood Co., Chas. N.	34

WHAT AND WHERE TO BUY—Continued from page 32

Ticket Choppers and Destroyers
Elec. Service Supplies Co

Tie Plates
Illinois Steel Co.

Ties and Tie Rods, Steel
American Bridge Co.
Carnegie Steel Co.
International Steel Tie Co.

Ties, Wood Cross (See Poles, Ties, Posts, etc.)

Tires
Fisk Tire Co.
Goodyear Tire Co.

Tokens
Johnson Fare Box Co.

Tongue Switches
Wm. Wharton, Jr. & Co.

Tools, Track & Miscellaneous
American Steel & Wire Co.
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
Hubbard & Co.
Railway Trackwork Co.
Ramapo-Ajax Corp.

Towers and Transmission Structure
American Bridge Co.
Bates Expanded Steel Truss Co.
Westinghouse E. & M. Co.

Track Grinder
Railway Trackwork Co.
Ramapo-Ajax Corp.

Track, Special Work
Columbia Machine Works & M. I. Co.
Ramapo Ajax Corp.

Trackless Trolley Cars
Brill Co., The J. G.
St. Louis Car Co.

Transfer Tables
American Bridge Co.

Transformers
General Electric Co.
Westinghouse E. & M. Co.

Transmission Towers & Structures
American Bridge Co.

Treads, Safety Stair, Car Step
Cincinnati Car Co.

Tree Wire
Okonite Co.
Okonite-Callender Cable Co

Trolley Bases
R. D. Nuttall Co.
Ohio Brass Co.

Trolley Bases, Retrieving
R. D. Nuttall Co.
Ohio Brass Co.

Trolley Bases
Brill Co., The J. G.
Westinghouse E. & M. Co.

Trolley Material, Overhead
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Trolley Wheel Bushings
Star Brass Works

Trolley Wheels (See Wheels Trolley)

Trolley Wire
Amer. Electrical Works
American Brass Co.
American Steel & Wire Co.
Anaconda Copper Min. Co.
Roebling's Sons Co., J. A.

Trucks, Car
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Cummings Car & Coach Co.
St. Louis Car Co.

Trucks, Motor
White Company

Truss Planks
Haskelite Mfg. Corp.

Tubing, Yellow and Black Flexible Varnish
Irvington Varnish & Ins.

Turbines, Steam
General Electric Co.
Westinghouse E. & M. Co.

Turntables
American Bridge Co.
Elec. Service Supplies Co.

Turnstiles
Elec. Service Supplies Co.
Perey Mfg. Co., Inc.

Valves
Ohio Brass Co.
Westinghouse Tr. Br. Co

Varnished Papers and Silks
Irvington Varnish & Ins. Co.

Ventilators, Car
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Heating Co.
Nichols-Lintern Co.
Nat'l. Ry. Appliance Co.
Railway Utility Co.
St. Louis Car Co.

Vestibule Linings
Haskelite Mfg. Corp.

Welded Rail Joints
Electric Railway Improvement Co.
Railway Trackwork Co.
Una Welding & Bonding Co.

Welders, Portable Electric
Electric Railway Improvement Co.
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Welders, Rail Joint
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.

Welding & Cutting Tools
International Oxygen

Welding Processes and Apparatus
Electric Railway Improvement Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Welding, Steel
Electric Railway Improvement Co.
Railway Trackwork Co.
Una Welding & Bonding Co

Welding Wire
American Steel & Wire Co.
Railway Trackwork Co.
Roebling's Sons Co., J. A.

Welding Wire and Rods
Railway Trackwork Co.

Wheel Guards (See Fenders and Wheel Guards)

Wheel Presses (See Machine Tools)

Wheels, Car, Steel & Steel Tire
American Steel Foundries
Bemis Car Truck Co.
Carnegie Steel Co.
Illinois Steel Co.
Standard Steel Works

Wheels, Steel Disc
Budd Wheel Co.

Wheels, Trolley
Columbia Machine Works & M. I. Co.
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
R. D. Nuttall Co.
Star Brass Works

Wheels, Wrought Steel
Carnegie Steel Co.
Illinois Steel Co.

Whistles, Air
Ohio Brass Co.
Westinghouse E. & M. Co.
Westinghouse Traction Brake Co.

Window Guards & Fittings
Cincinnati Car Co.

Wire Rope
American Steel & Wire Co
Roebling's Sons Co., J. A.

Wires and Cables
American Brass Co.
American Electrical Works
American Steel & Wire Co
Anaconda Copper Min. Co.
General Electric Co.
Okonite Co.
Okonite-Callender Cable Co. Inc.
Roebling's Sons Co., J. A.
Westinghouse E. & M. Co.



Large crowds attended the first appearance of the Brill 1928 Model Electric Car.

Public Opinion

an important factor

in

Car Design

and equipment

How will the public like it? Will it prove sufficiently popular to stimulate the people's desire to ride?

In designing the Brill 1928 Model Electric Car every effort was put forth to win public favor. Noise reduction, low racy appearance and comparatively quick starting and stopping induce the prospective passengers on the sidewalk to ride. Added to these, full-vision side windows, wide sloping windshields, comfortable seats, beautiful interior finish and absolute safety of operation contribute to the passengers' satisfaction with the service. After all, upon public opinion depends the success of any transportation service.

BRILL 1928 Model



Comfort for both Passengers and Operator

Brill 1928 Model equipped to meet the modern demand for improved service, the kind which will keep the automobile in the garage.

Inviting comfort, the kind which sells transportation, is characteristic of the latest development in electric cars —the Brill 1928 Model. Careful selection of seating equipment with deep spring cushion construction and backs pitched just right to permit relaxation has resulted in a vehicle which affords maximum comfort to both passengers and operator. The Brill No. 1006 "De luxe" Seat at each end not only is constructed and upholstered like the Brill No. 201-B-1 type seats, but in addition is adjustable for height and leg room. In every detail the Brill 1928 Model conforms to the higher standard of living enjoyed today by the American public.

Write for copy of Publication No. 320.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.
AMERICAN CAR CO. ST. LOUIS MO. — G.C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO SPRINGFIELD, MASS.

PLYWOOD
HASKELITE
PLYMETL

HASKELITE

PLYW
HASKE
PLYM

On the leading Massachusetts line



One of the 50 cars built by Wason Manufacturing Company for Springfield Street Railway Company with HASKELITE wainscoting.



One of the 25 cars built by Wason Manufacturing Company for Eastern Massachusetts Street Railway with HASKELITE headlining and wainscoting. Illustration below shows interior of same car.

HASKELITE products are preferred by leading roads not only for roofs and side panels but also in many cases for wainscoting and headlinings.

The Wason Manufacturing Company, Springfield, Massachusetts, has recently produced two lots of cars —50 for the Springfield Street Railway Company with HASKELITE wainscoting and 25 for the Eastern Massachusetts Street Railway with HASKELITE headlining and wainscoting.

The light weight, strength and beauty of finish possible with HASKELITE and PLYMETL are ample justification for the adoption of these materials in car and bus construction. Details on request.

Haskelite Manufacturing Corporation

133 West Washington Street, Chicago

Railway Representatives:

Economy Electric Devices Co., 37 W. Van Buren St., Chicago
Grayson Bros., 600 LaSalle Bldg., St. Louis, Mo.
Railway & Power Engineering Corp., Toronto, Ont., Canada



ELECTRIC RAILWAY JOURNAL

Graw-Hill Publishing Company, Inc. DECEMBER 31, 1927 Twenty Cents per Copy

"Sweeping an Industry"





FRANK R. FAGEOL

Designer and originator of Street Car Type Twin Motored Coach, carrying 80 to 110 passengers.

We believe coaches with motors forward will hereafter be looked upon as old fashioned. Why should engines use up passenger capacity and waste street space?

As always Frank R. Fageol is the leader in coach transportation—again his Twin Coach demonstrates this often spoken truth

TWIN COACH CORPORATION

KENT, OHIO

Twin Coach



Protection

against extreme conditions

TO shoot through the clouds, a hundred miles an hour or more, the aviator needs special protective dressing—ordinary clothes won't do.

Railway motors also operate under conditions that call for more than "save-the-surface" varnish for insulation.

To effectually resist the vibration, the moisture and the extremes of heat and cold, the insulating varnish must have special characteristics. Westinghouse varnish No. 335 has those characteristics. This special varnish is an important factor in Westinghouse motor performance. Keep it on hand for any motor insulation that may become necessary from time to time. You can buy it by the can.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in All Principal Cities of the United States and Foreign Countries

TOUGHER THAN RHINOCEROS HIDE



Westinghouse

X91083

INSULATING Varnish

MEMBER AERA 1927

MORRIS BUCK
Managing Editor
JOHN A MILLER, Jr.
Associate Editor
CLARENCE W SQUIER
Associate Editor
CARL W. STOCKS
Associate Editor

ELECTRIC RAILWAY JOURNAL

CHARLES GORDON, *Editor*

HENRY W. BLAKE
Senior Editor
GEORGE J. MacMURRAY
News Editor
O. W. JAMES, Jr.
Assistant Editor
PAUL WOOTON
Washington Correspondent
ALEX McCALLUM
Editorial Representative
London, England

Vol. 70
No. 27

Pages
1177-1214

CONTENTS

DECEMBER 31, 1927

Editorials 1177

Atlanta Builds for Future With New Cars and Better Service 1180
Convinced that modern equipment and improved service will ultimately win public patronage and support, the Georgia Power Company, in its brief for the Coffin Award, outlines the courageous policy that has finally brought an upturn in the earnings on its investment.

Little Rock Issues Time-Table 1184

Unusual Acts to Improve Public Relations 1184

Paris Revises Street Railway and Bus Franchise 1185
By HENRY W. BLAKE.
City makes changes in the method of calculating the bonuses for good management and economy of the local bus and street railway company. A 25 per cent increase in fares caused some decrease in passengers last year, but a large increase in gross and net receipts.

Safety Car Brings Vital Message to Interstate Public Service Patrons 1189

Australian Pension Plans Discussed 1190
Melbourne study shows that pensions cannot be paid out of fares alone—Deferring payments is a dangerous expedient.

Illinois Central Has Steadily Improved Its Suburban Service 1191
By W. M. VANDERSLUIS.

Revenue Doubled by Modernization of Porto Rico Railway 1193
By FREDERICK KRUG.
New cars have been bought, some old cars have been remodeled and track has been rebuilt. Polarity of electric distribution has been reversed.

California Commission's Work 1195

Apprentice Course Works Well in St. Louis 1196
Four-year course, with concurrent training in trade school, attracts young men to railway shops. The majority stay with company after graduation.

Street Railway Operation of Buses in Germany 1196

Maintenance Methods and Devices 1197

Grease Lubrication for Brake Hangers 1197
By J. ED LAWLESS.

Convenient Commutator Slotter 1197

Aligning Carbon Box with Brush-Holder Studs 1198

New Equipment Available 1198

Edgewise-Wound Resistor 1198

Ticket Printer for Use in Ticket Office 1198

Adjustable Head in New Spray Gun 1199

Association Activities 1200

News of the Industry 1201

Recent Bus Developments 1207

Financial and Corporate 1209

Personal Mention 1211

Manufactures and the Markets 1213

What Are the Prospects for 1928?

NOW that the old year draws to a close everyone's attention is focused on the question of what 1928 holds in store. This is the season when prognosticators reach the zenith of their activity. Their past mistakes have been dimmed by the charitable hand of time and there is as yet no way of checking the accuracy of their predictions for the future.

After all, fate is inexorable and the pages of the book of time are closed to human eyes. Expression of opinion as to what the future holds in store is worthless, except in so far as it is limited to an analysis of trends and probabilities based upon accumulated experience.

Look to the Annual Statistical Number of the JOURNAL, which will be dated Jan. 14, for the facts regarding the industry's trends. There also you will find a forecast of activity in 1928, based not on opinion, but upon the industry's budget estimated from the figures supplied by operating companies that co-operate in the preparation of this issue.

McGRAW-HILL PUBLISHING COMPANY, INC.
Tenth Avenue at 36th Street, New York, N. Y.
New York District Office, 285 Madison Ave.

JAMES H. McGRAW, President
JAMES H. McGRAW, JR., V.-P. and Treas.
MALCOLM MUIR, Vice-President
EDWARD J. MEHREN, Vice-President
MASON BRITTON, Vice-President
EDGAR KOBAK, Vice-President
C. H. THOMPSON, Secretary

WASHINGTON:
National Press Building
CHICAGO:
7 S. Dearborn Street
PHILADELPHIA:
1600 Arch St.
CLEVELAND:
Guardian Building
ST. LOUIS:
Bell Telephone Building
SAN FRANCISCO:
883 Mission Street
LONDON:
6 Bouverie Street, London, E. C. 4

Member Associated Business Papers, Inc.
Member Audit Bureau of Circulations

Cable Address: "Machinist, N. Y."

Publishers of
Engineering News-Record
American Machinist
Power
Chemical and Metallurgical Engineering
Coal Age
Engineering and Mining Journal
Ingeniería Internacional
Bus Transportation
Electric Railway Journal
Electrical World
Industrial Engineering
Electrical Merchandising
Radio Retailing
Construction Methods
Electrical West
(Published in San Francisco)
American Machinist—European Edition
(Published in London)

The annual subscription rate is $4 in the United States, Canada, Mexico, Alaska, Hawaii, Philippines, Porto Rico, Canal Zone, Honduras, Cuba, Nicaragua, Peru, Colombia, Bolivia, Dominican Republic, Panama, El Salvador, Argentina, Brazil, Spain, Uruguay, Costa Rica, Ecuador, Guatemala, Chile and Paraguay. Extra foreign postage to other countries $3 (total $7 or 29 shillings). Subscriptions may be sent to the New York office or to the London office. Single copies, postage prepaid to any part of the world, 20 cents.

Change of Address—When change of address is ordered the new and the old address must be given, notice to be received at least ten days before the change takes place.
Copyright, 1927, by McGraw-Hill Publishing Company, Inc.
Published weekly. Entered as second-class matter, June 23, 1908, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Printed in U. S. A.



Fageol Twin Coach of the Pittsburgh Motor Coach Company. The Twin Coach as well as many other modern coaches is furnished with the Westinghouse Automotive Air Brake, as standard equipment.

More Air Braked Coaches for Pittsburgh

PERHAPS in no other city are coach operating conditions more severe. Heavy traffic congestion, long hard hills, and unusual competition for the right of way have made the Air Brake a necessity.

The Westinghouse Air Brake is not new to Pittsburgh. For the past several years, the Pittsburgh Motor Coach Company has operated various makes of motor vehicles, including White, Fageol, Safeway, and by recent delivery several Fageol Twin Coaches, also Westinghouse Automotive Air Brake equipped. With this array of equipment, under modern brake control, the Pittsburgh Motor Coach Company has been able to set and maintain perfect schedules in spite of the conditions under which they serve.

This is just one instance in which the Westinghouse Air Brake has played an auspicious part . . . A representative from any of our conveniently located offices will be glad to tell you of others and go over your braking problems with you . . . without obligation of course.

Hold your place in traffic lanes, get the benefits of your full speed and power, relieve drivers from undue physical exertion, protect your equipment from strain caused by unequal applications . . . modernize with the Westinghouse Automotive Air Brake.

WESTINGHOUSE TRACTION BRAKE COMPANY
Automotive Brake Division: WILMERDING, PENNA.

6204

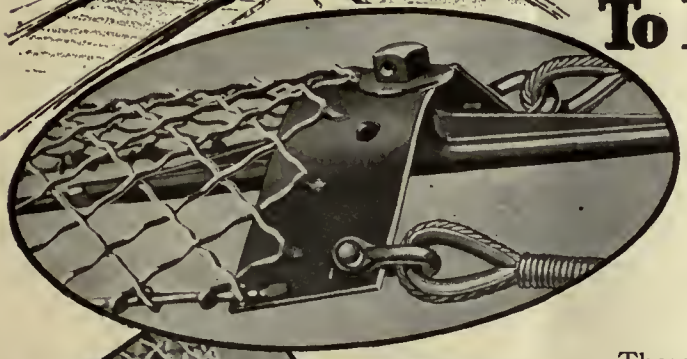
WESTINGHOUSE
AUTOMOTIVE AIR BRAKES

DOLLARS AND SENSE!



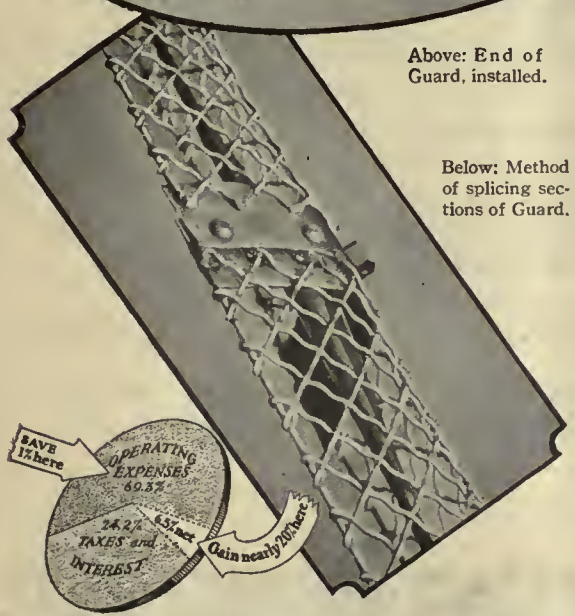
Add "Safety Crossings" To 1928 Improvements!

YOU gain more than protection against dewirements, stalled cars, and possible serious accidents, when you make dangerous railroad crossings "Safety Crossings" with the installation of O-B Trolley Guard. Goodwill, faster schedules, and lower operating expense are additional rewards.



Above: End of Guard, installed.

Below: Method of splicing sections of Guard.



Service betterment, on which increased revenue depends, involves more than just major improvements in the design of cars. Detail improvements in operation and minor items of overhead equipment are equally important. "Safety Crossings" are among these minor improvements that loom large in making better service a fact.

These important advantages follow because the installation of Trolley Guard shows a consideration for the car rider's safety and comfort that is not unnoticed; and because such installations prevent delays and save time at railroad crossings, thus speeding up schedules and reducing operating expenses.

The low initial cost of Trolley Guard—now 20% less than a year ago—makes its advantages available to every electric railway. And since Trolley Guard is made in 10-ft. sections, installation and maintenance expense is also lower today. For the new 10-ft. sections make it unnecessary to form the Guard on the job and to put it up in one long unwieldly piece. Formed at the factory before shipment, the Guard reaches you with yokes and end-plates attached, ready to hang.

Considering all these advantages of Trolley Guard, its cost is a small premium to pay for the large return on the investment. Therefore "Safety Crossings" may well be placed near the top of your list of improvements planned for 1928. For complete particulars address

Ohio Brass Company, Mansfield, Ohio
Dominion Insulator & Mfg. Co., Limited
Niagara Falls, Canada
776B

Ohio Brass Co.

SALES OFFICES: NEW YORK CHICAGO PHILADELPHIA PITTSBURGH CLEVELAND SAN FRANCISCO LOS ANGELES

PORCELAIN INSULATORS
LINE MATERIALS
RAIL BONDS
CAR EQUIPMENT
MINING MATERIALS
VALVES

Interlocking brakes and doors by means of the M-28 Brake Valve with selective control, increases safety and convenience



Giving Impetus to Transportation Service



SPEEDY transportation is vital to present-day conditions. Car riders want it; car owners need it.

An important factor in the realization of this objective is the Safety Car Control Equipment. It brings economic advantages that warrant additional cars . . . assures the quickest possible brake action . . . provides maximum convenience and flexibility in controlling entrance and exit . . . safeguards operation by interlocking power, brakes, and doors and by centralizing responsibility.

Safety Cars are giving a noteworthy impetus to transportation service on hundreds of traction properties.



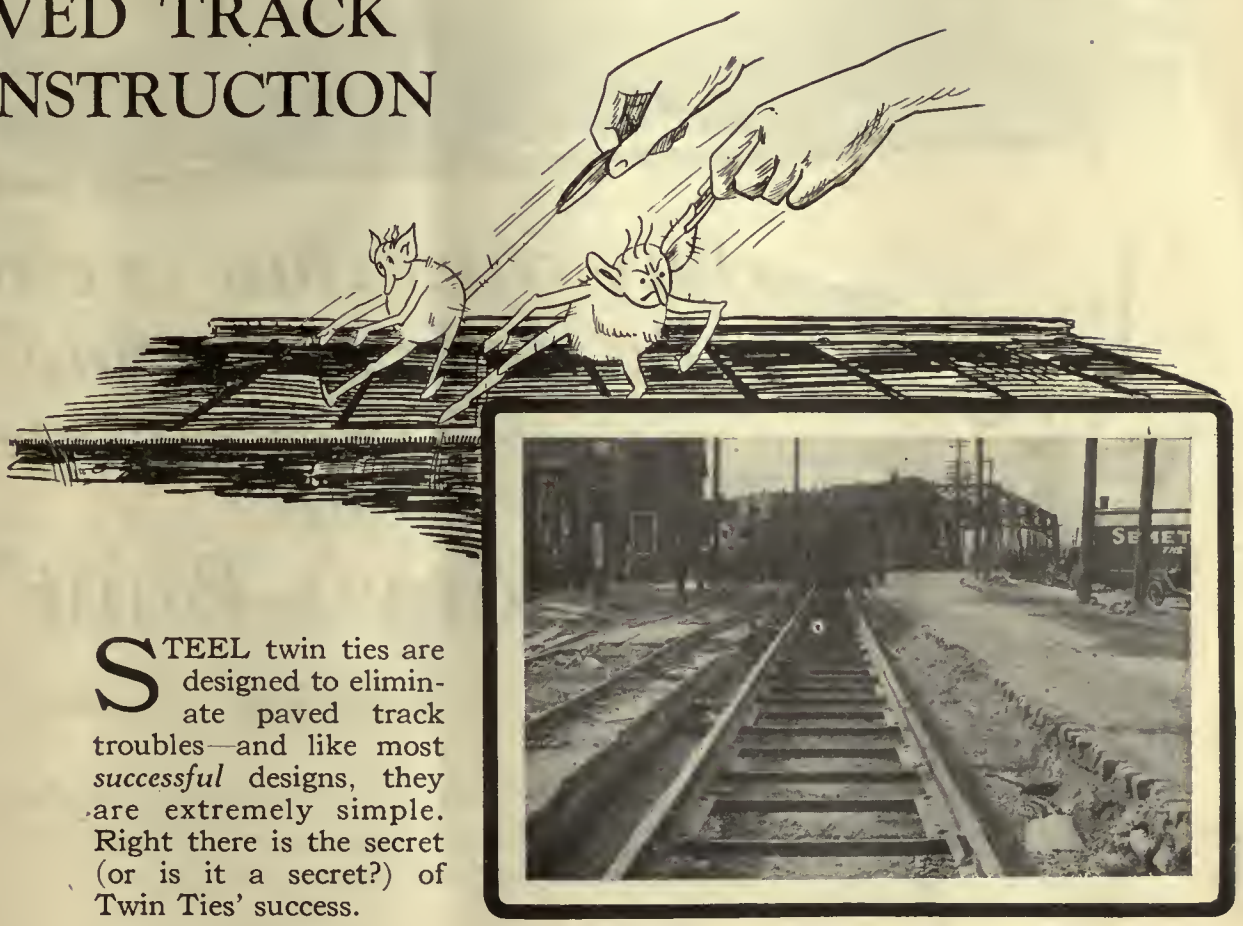
SAFETY CAR DEVICES CO.
OF ST. LOUIS, MO.

Postal and Telegraphic Address:
WILMERDING, PA.

CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH

Interlocking the power and brakes by means of special controller handle provides safeguard against operator's inattention or disability

TAKING THE BUGS OUT OF PAVED TRACK CONSTRUCTION



STEEL twin ties are designed to eliminate paved track troubles—and like most *successful* designs, they are extremely simple. Right there is the secret (or is it a secret?) of Twin Ties' success.

Steel Twin Ties on Seneca St., Buffalo

And in eliminating such maintenance problems as spreading rails, rotted ties, pavement breakdowns, weakened joints, cracked foundations and the like, we have added many strengthening features. Twin ties become as much a part of the foundation as the concrete itself.

Add to all this the initial economy of using Steel Twin Ties and there is but one course to follow in planning your 1928 extension or rehabilitation campaign.

Write today for delivered prices.

THE INTERNATIONAL STEEL TIE CO.

CLEVELAND, OHIO

Steel Twin Tie Track

THE BASE OF MODERNIZATION



In 1928 *buy cars that create the desire to ride—*

and to repeat a comfortable ride—

buy

"Thomas-Built" Cars

Their extreme safety, attractive appearance and unusual comfort make them a welcome asset in any community.

And on the basis of lower operating costs and maintenance expense, *"Thomas-Built"* Cars have certainly proved their worth.

Note the list of prominent installations—typical of the many other cities being served by *"Thomas-Built"* Cars.

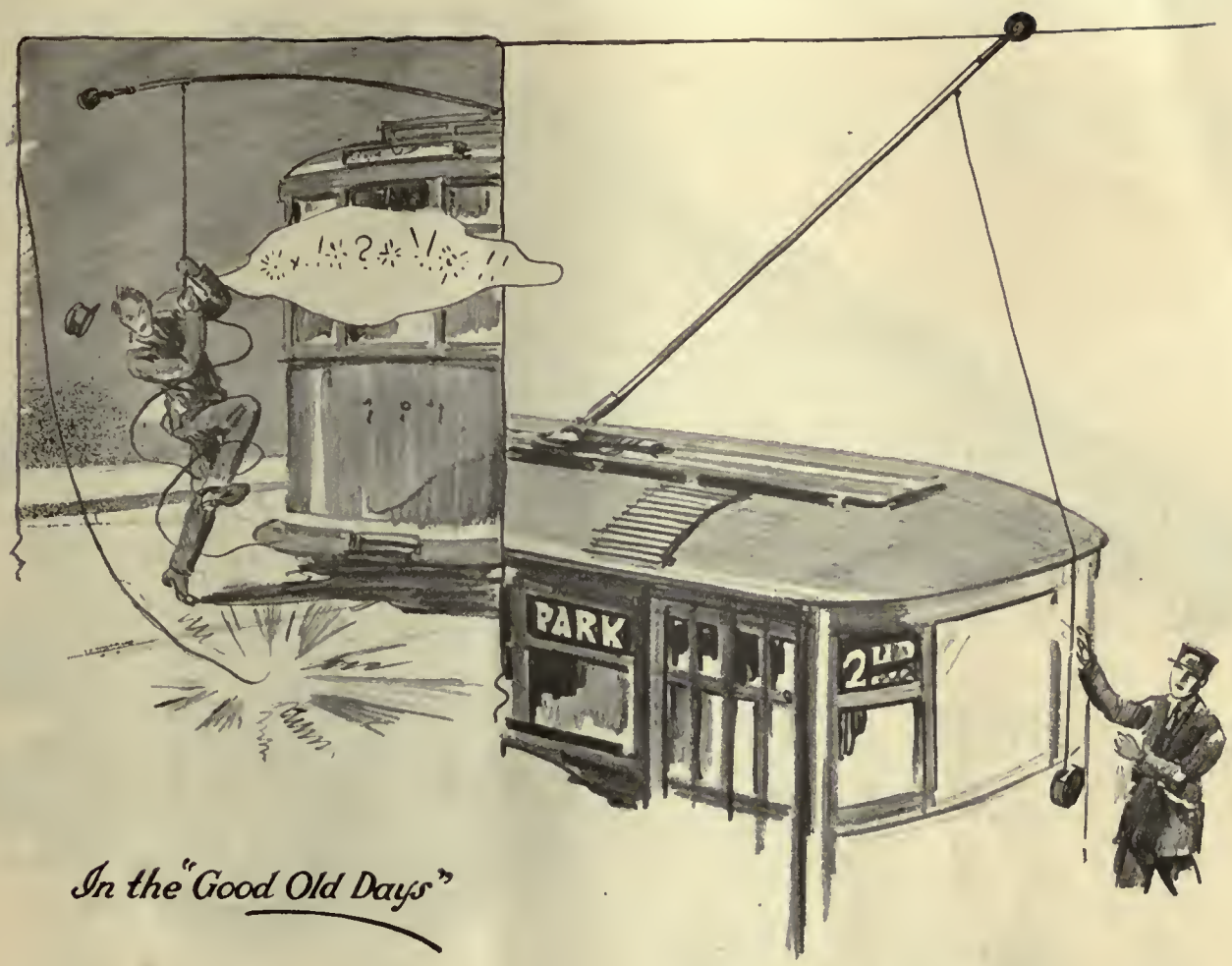
What you may expect *"Thomas-Built"* Cars to accomplish for you, might be demonstrated with figures of what they have accomplished on other well-known electric railways. Shall we send you these figures?

Some communities served by "Thomas-Built" Cars

Augusta, Ga.
Helena, Mont.
Miami, Fla.
Durham, N. C.
Trenton, N. J.
New Orleans, La.
Hampton, Va.
Sheffield, Ala.
Danville, Va.
Greenville, S. C.

PERLEY A. THOMAS CAR WORKS

High Point, N. C.



In the "Good Old Days"

and To-day:

Many a wreck was made of the overhead system when a trolley pole jumped the wire. For there'd be a resounding smack and the wire would come tumbling down. And what the motorman said was never fit to print. Not to mention the cost to the company in tied up service, repair bills and other items that eat into profits.

There's no such trouble nowadays when Keystone Trolley Catchers are used. They catch the pole with the speed and precision that a baseball catcher picks off a foul tip. The only delay is the minute the motorman takes to put the trolley back on the wire.

Other items that cut down costs and sell more rides are fully described and illustrated in Catalog No. 7. Write us for your copy.



Keystone Trolley Catchers

Trolley catchers are for use on railway cars to "catch" the trolley pole when it leaves the wire. Their construction enables these catchers to "catch" the pole an instant after it "flies," saving the "banging" of the overhead structure and the resulting wear and tear and expense involved for repairs and delays in service.

Home office and plant at 17th & Cambria Sts., PHILADELPHIA; District Offices at 230 So. Clark St., CHICAGO; 50 Church St., NEW YORK; Bessemer Bldg., Pittsburgh; 88 Broad St., Boston; General Motors Bldg., Detroit; 316 N. Washington Ave., Scranton; Canadian Agents, Lyman Tube & Supply Company, Ltd., Montreal, Toronto, Vancouver.

ELECTRIC SERVICE SUPPLIES CO.

MANUFACTURER OF RAILWAY, POWER AND INDUSTRIAL ELECTRICAL MATERIAL



HIGH SPEED and SAFETY

WHEN YOUR interurban cars are clipping off the miles at a high speed you want to know that you have safeguarded your patrons and your reputation. "Standard" rolled steel wheels are built to stand up with the maximum of safety under all conditions.

also
Axles
Armature Shafts
and
Springs



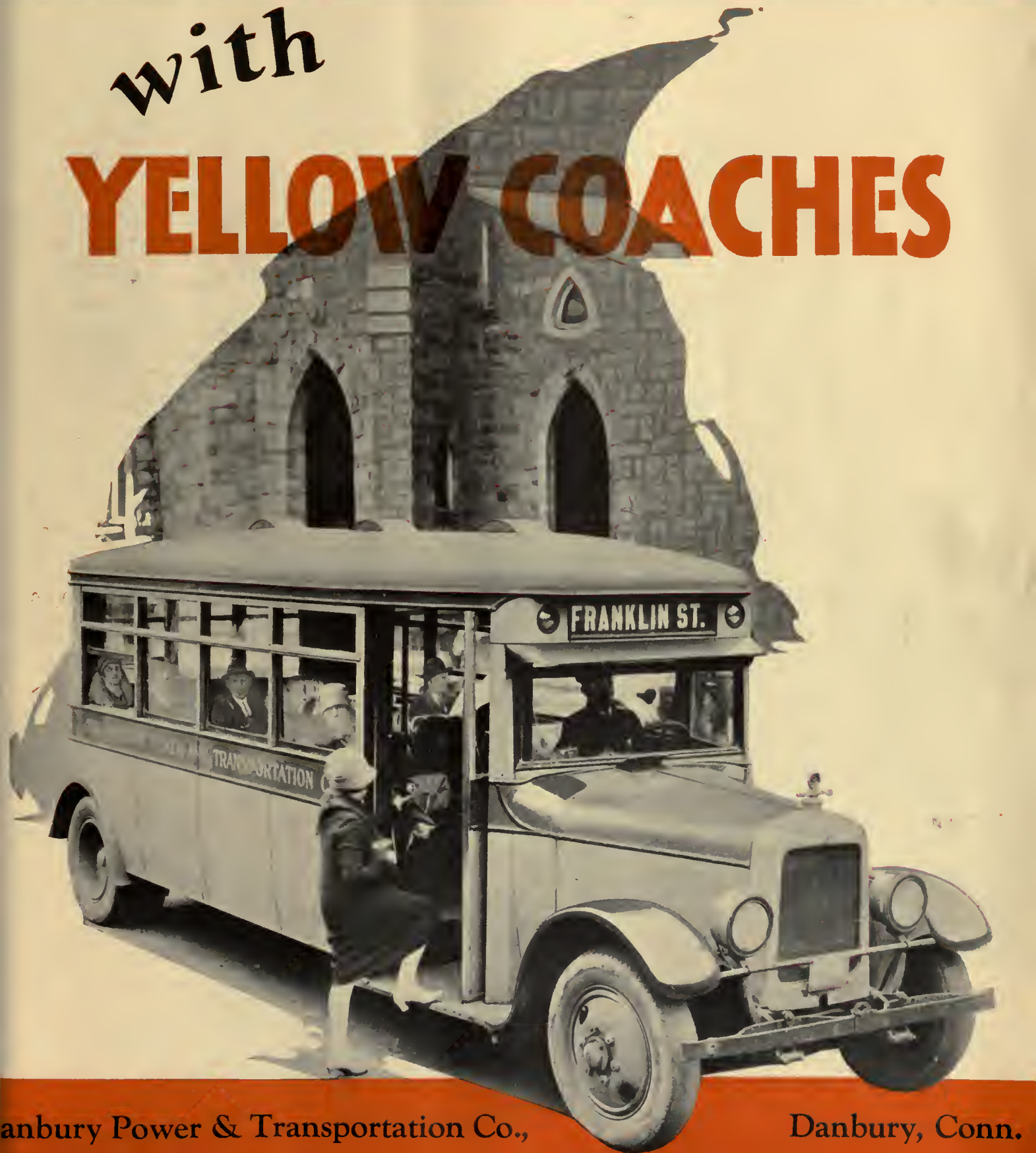
STANDARD STEEL WORKS COMPANY
PHILADELPHIA, PA.

BRANCH OFFICES
CHICAGO
ST. LOUIS
NEW YORK
HOUSTON
PORTLAND
RICHMOND
MEXICO CITY
SAN FRANCISCO
ST. PAUL
PITTSBURGH

WORKS: BURNHAM, PA.

Turning a Public Utility Deficit *into a* Public Utility Profit ≈

with YELLOW COACHES



anbury Power & Transportation Co., Danbury, Conn.

They did it in



	AVERAGE MONTH of Street Car Operation Year 1925	AVERAGE MONTH of Motor Coach Operation 9 Months, 1927
Operating Revenue	$12,299.62	$11,680.14
Operating Expense	10,566.64	7,694.63
Depreciation	0.0	821.39
Taxes	791.67	643.30
Net Operating Income	$941.31	$2,520.82

DANBURY - CONN.

DANBURY was faced with a serious transportation problem—a problem that finds its duplicate elsewhere. Street car patronage was constantly declining. Track and rolling stock were in bad condition and the operating company could not hold their patronage because they could not sell transportation. Financial conditions made it impossible to rehabilitate.

In 1924, A. William Sperry, transportation and managing engineer, was employed by the bond holders' committees to examine the property and make recommendations for improving service. On November 19, 1926, the company was reorganized and Mr. Sperry was made Vice President and Manager with instructions to carry out the recommendations he had suggested. Shortly thereafter, street car service was abandoned and a 100 per cent motor coach operation, using Yellow Coaches, was effected. The substitution was complete. Since then, not a street car wheel has turned in Danbury.

Operating expenses decreased 27%
Net income increased 267%
Investment decreased 70%

And the Danbury Power & Transportation Company owns outright their garage, repair shop and offices and have properly included organization expense in their investment account.

Today, after thorough test and comparison, the operation shows—

That all passenger requirements in a normal American factory city of 30,000 can be successfully and profitably met by motor coaches, and in this case, without change in normal street car fare.

That in such a city, motor coach operation requires less than one-third the investment necessary for street car operation.

That a well managed but financially unsuccessful street car operation can be completely replaced by motor coach service and earn a satisfactory profit.

That efficient, up-to-date management, equipment of proper capacity and construction and carefully planned maintenance work will win public approval and gratifying financial results.

That a completely motorized service permits the serving of sparsely settled territory not formerly reached by street car service and the absorption of the losses incurred in such service.

Danbury rush hour demands are the same as in any normal factory city of comparable size. Street paving conditions were unusually good in-so-far as the street car company was concerned and much of the track was laid in the open between two paved lanes.

They did it in Danbury! "And how" is shown on the next page.

figures that talk



and

at the DANBURY FAIR

Every year, in October, Danbury has a Fair, held on the outskirts of the city. During Fair Week, the population of Danbury is increased 75%.

Formerly, the street car line running to the Fair grounds was woefully inadequate to carry the crowds. This year, Yellow Coaches handled the demands of mass transportation without a hitch. During the rush periods, Yellow Coaches left the Fair grounds on a schedule of less than three minutes without interrupting regular service. From a normal daily passenger carriage of approximately 3,900 on all lines, over 9,304 people were carried during one day of the Fair. And during the entire week, with every unit for equipment in constant use, there was only one case of mechanical trouble for the entire fleet.

INTERESTING Revenue and Statistical Figures covering the operation of Yellow Coaches for the first nine months of this year, from January 1 to September 30.

Item	9 Months Period	Per Coach Mile
Operating Revenue	$105,121.25	28.44
Operating Expense	76,644.15	20.73
Taxes	5,789.47	1.57
Net Operating Income	22,687.63	6.14
Revenue Passengers	1,078,058	
Transfer Passengers	122,855	
Passenger Revenue	$103,971.55	
Average Fare	9.6	
Route Miles Operated	17.5	
Total Mileage	369,627 miles	

OPERATING COSTS

Covering the operation of Yellow Coaches for the first nine months of this year, from January 1 to September 30.

Item	9 Months Period	Per Coach Mile
Drivers	$21,128.65	5.72
Gas & Oil	10,366.63	2.80
Garage Labor & Expense.	6,525.09	1.77
Superintendence & Misc..	3,159.74	.85
Total Transportation..	$41,180.11	11.14
Maintenance of Buildings & Equipment	$9,759.93	2.64
Depreciation	7,392.54	2.00
Total Maintenance	$17,152.47	4.64
General Officers & Office Supplies	$7,720.00	2.09
Insurance & Damages	9,027.43	2.44
Legal & Other Expenses..	1,564.15	.42
Total General	$18,311.57	4.95
Grand Total	$76,644.15	20.73

YELLOW TRUCK & COACH MANUFACTURING CO.
SUBSIDIARY GENERAL MOTORS CORPORATION
5801 WEST DICKENS AVENUE, CHICAGO, ILL.

Wishing you a

Merry Christmas

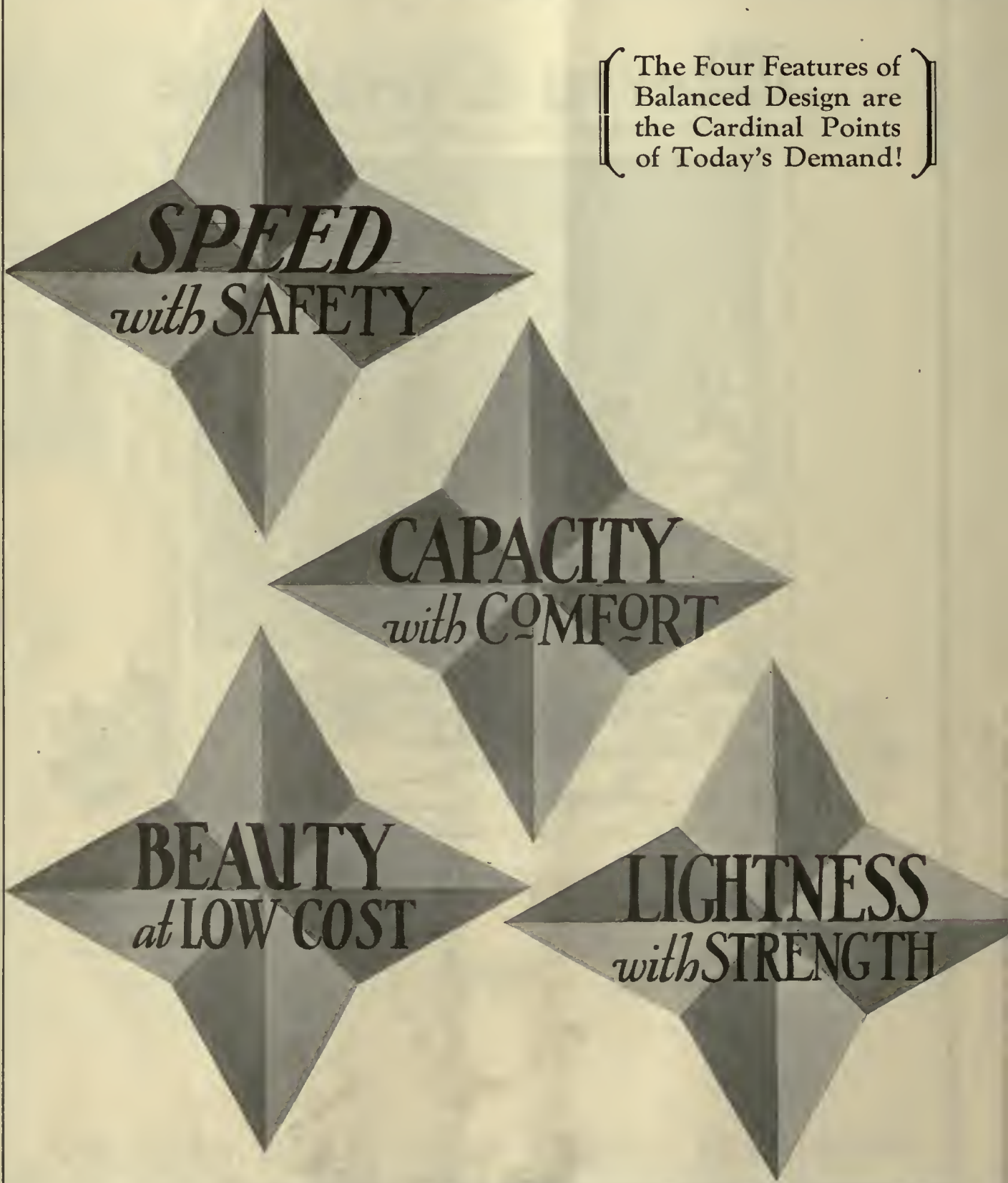


and a HAPPY · NEW · YEAR

NATIONAL PNEUMATIC COMPANY

Building or mere

The Four Features of Balanced Design are the Cardinal Points of Today's Demand!



ly rebuilding?

The difference is important to future-minded electric railway operators. The one implies leadership, the other an effort to "follow the crowd."

We of the Cincinnati Car Company are earnestly endeavoring to build a leadership standard into the electric car of today and tomorrow.

We have established a principle of car-building,—BALANCED LIGHTWEIGHT DESIGN,—which brings every step in the building of the modern car under one thoroughly competent supervision.

We have capitalized long truck building experience to develop three of the most advanced types, at present available, the Cincinnati Lightweight City-type Truck, the Cincinnati Lightweight High-Speed Interurban-Truck, and the Cincinnati Cast Aluminum Frame Worm-Drive Truck.

We have developed and perfected the Duplex Air and Magnetic Brake for both city and interurban service. Furthermore we have installed in our plant the most efficient low-cost "mass production" machinery.

If you too, as an operator, are interested in *building* rather than rebuilding, we can work together to our mutual benefit. Bear in mind that every installation of Cincinnati NEW Lightweight Cars made to date has been successful.

Cincinnati Car Company, Cincinnati, Ohio

CINCINNATI
BALANCED LIGHTWEIGHT CARS

—still a step ahead of the modern trend

These deluxe single-truck cars increased revenue 7% in eight months



—in Jamestown, N. Y.

With good track, the light-weight, one-man, single truck, safety car is without competition in economical transportation.

That cars of this type, whose greatest utility is confined to cities of less than 100,000 population where automobiles make greatest inroads on operating revenue, should meet transportation needs profitably is a remarkable tribute to the industry.

The Jamestown Street Railway, Jamestown, N. Y., had faith in such cars—products of the Quality Shops—and increased revenue 7% in eight months—and this in spite of the increased first cost of de luxe equipment.

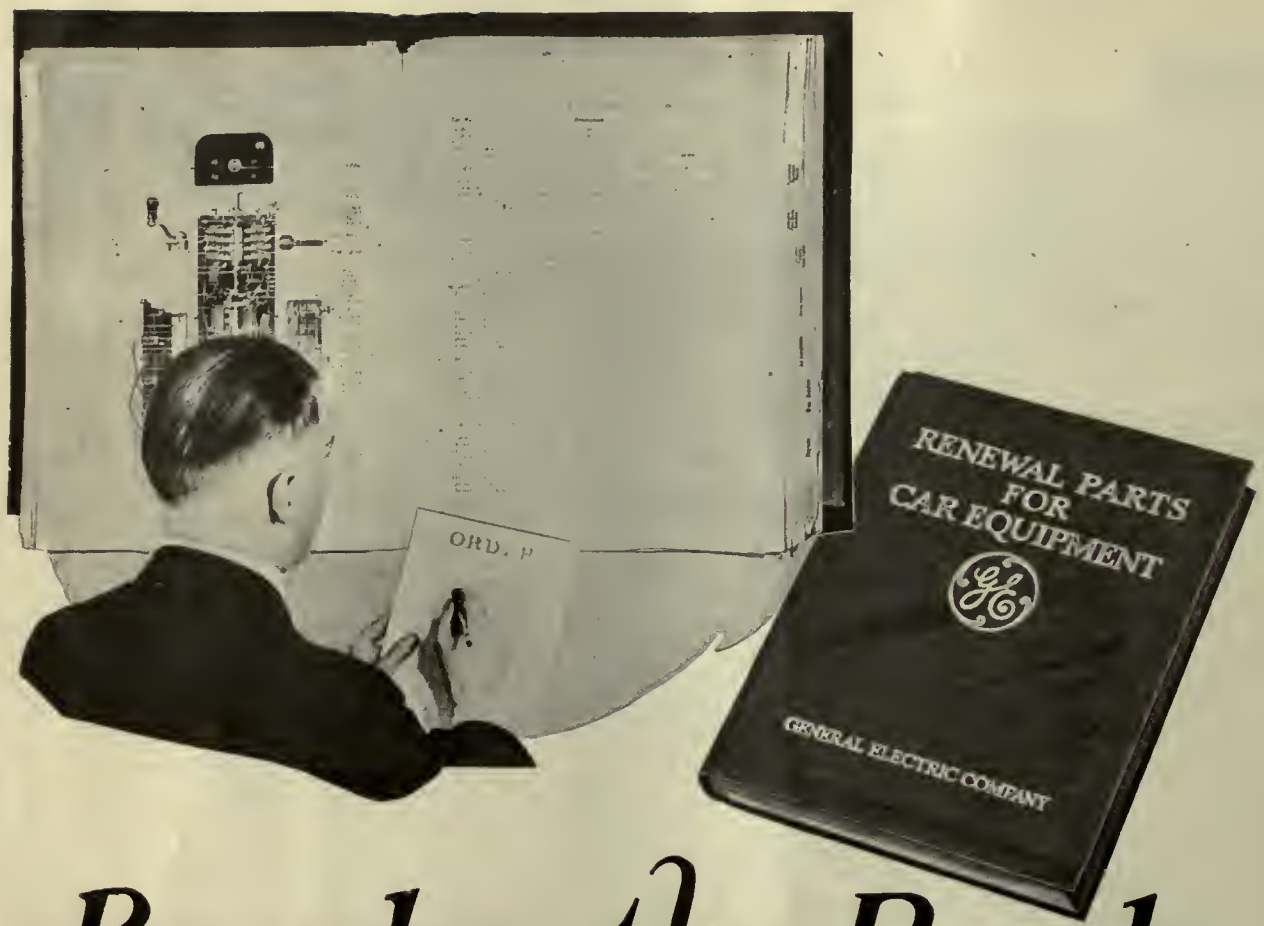


The foresight of Jamestown is the hind sight of many operators—give the public the comfort they demand and they'll "come again."

There's a steady welcome jingle in the fare boxes of St. Louis cars.

St. Louis Car Co.

Quality Cars



Buy by the Book

for original equipment quality

To obtain renewal parts that fit; to obtain exact duplicates of the originals, in quality and workmanship; to be certain of a life equal to that of the originals, order from the equipment manufacturer.

Your G-E Renewal Parts Catalog was prepared individually for you in order to help you carry out this policy—the only safe policy.

Buy by your book.

Your G-E Renewal Parts Catalog gives you exact ordering information for all parts, insuring duplication of the originals. Your G-E Railway Supply Catalog is a guide to modern equipment standards, and can be consulted to advantage in connection with your modernization program.

54C-31

GENERAL ELECTRIC

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review
Published by McGraw-Hill Publishing Company, Inc.
CHARLES GORDON, *Editor*

Volume 70 New York, Saturday, December 31, 1927 *Number 27*

Overlapping Sectional Meetings Cut Attendance

ON SEVERAL occasions the JOURNAL has called attention to the overlapping of sectional association meetings. During the month of January there are scheduled four such meetings, each of which interferes with one or more of the others. This is undesirable from several standpoints, most important of which is the reduction of attendance at the meetings themselves.

Manufacturers in particular suffer from this unfortunate circumstance. Instead of covering several sectional meetings by routing a man so as to attend them on one trip, it frequently becomes necessary to send out several men for long distances, or to omit attendance at one or more meetings. This does not apply only to manufacturers. In some instances alert operating organizations send men outside the confines of their own territory to attend neighboring sectional meetings. Overlapping dates discourage such a progressive policy. Again, there has grown up during recent years the desirable practice of inviting officers or staff members of the American Association to address sectional meetings. Simultaneous meetings in several widely separated locations sometimes make it impossible for association executives, who would otherwise do so, to lend this desirable co-operation.

In the last analysis, offending associations are themselves the greatest sufferers from carelessness in setting meeting dates. In rare instances these dates are fixed in the association's constitution or by-laws. When that is so there seems to be no good reason why two overlapping associations should not take up this matter with each other and agree upon changes to be made in their constitutions at the first opportunity. Most conflicts, however, are attributable to lack of proper checking when the dates for meetings are fixed by executive committees.

The JOURNAL has endeavored to aid in relieving this situation through publication every week of meeting dates as promptly as they are announced. These dates are carried in the calendar every week until the meeting is held. The JOURNAL will be glad to co-operate further with sectional associations by answering promptly any inquiries regarding conflicting dates at the time a sectional meeting is being planned.

Regulation of Interstate Motor Carriers an Issue Again

CONGRESS again has before it the question of the regulation of buses and trucks engaged in interstate commerce. The two bills so far presented are the so-called Parker and Dennison measures, but the House committee on interstate and foreign commerce will not act on any bill until the report of the Interstate Commerce Commission on Docket 18,300 is presented. Oral argument on the commission's docket is now set for Feb. 10.

Opinion appears to be as divided as ever about the need of regulation and the methods that should be adopted to bring the interstate carriers within regulative purview greater than that afforded the states at present through the exercise of their police powers. The far-fetched view, perhaps, is that need for regulation does not exist. The saner view is the one which has as its object a measure of regulation that will not have the effect of strangling the development of the industry. Each plan so far advanced has its able advocates. There may be good reasons for the advocacy of the plan of conferring jurisdiction on the local commissioners, with the I.C.C. as a court of last resort only in the event that matters in dispute cannot be otherwise settled.

It is, of course, too early to attempt to predict the probable outcome. The position of the electric railways in the matter has been stated in their brief. If the opinion of Interstate Commissioner Esch is a criterion, then that body is not in sympathy with the idea that regulation of the interstate bus carriers should be deferred. According to him, had Congress regulated traffic by rail carrier years earlier much of the time and labor of the I.C.C. might have been avoided, and many actions now brought to the commission for consideration might have been obviated. Certainly regulation is the order of the day. The many electric railways that have supplemented their rail service by the operation of buses have sought authority from the states or municipalities, and it is true that such operation by the electric railways is frequently subject to competition from bus lines engaged in interstate business and subject only to the local police power.

Despite the need of protecting the electric railways, the steam lines and the certificated bus lines from encroaching upon each other, it is important that grave injustice be not done to one or more of these interests. Even a continuation of the present unsettled state, deplorable in many of its aspects, is better than ill-advised legislation that might work hardships greater than the evils it was intended to correct.

Schedule Speeds Can Be Improved

SCHEDULE speeds on many electric railways have not seen improvement commensurate with the trend of the times or the demands of the public. While this is true of some large properties, it is particularly noticeable on the smaller systems. Unfortunately, it is in the small cities that the need for improvement is most apparent. As a rule, in the small cities the speeds always have been lower than in the large ones. It is in the small cities that the opportunity for active competition by the private automobile is greatest. The small systems with infrequent service and short runs do not, of course, give the opportunities for saving cars by speeding up that are evident where the headways are close and the lines

are long. Often the remark is made by a manager that the operators might just as well be spending their time in dragging their cars over the road as to hurry through and then loaf at the terminals.

From a standpoint of manual efficiency this may be true, but from the standpoint of winning public support it is far from correct. One of the standing complaints of the railway patron is that while the street car is moving slowly and majestically along the street all the other traffic is passing by and leaving it in the rear. Even though it may be proved that the car gets to its destination only a minute or two later, that does not pacify the rider who is annoyed by the slowness of the car. After he has had his fill of it he buys an automobile. Soon he joins the ranks of the agitators who want the trolley tracks torn up.

As an indication of how bad the situation may be in some cities, and of how much it can be improved, the experience in Charleston, S. C., is worthy of note. Here the schedules a few years ago called for an average speed of 7.5 m.p.h. Contrast this with the 10 to 11 m.p.h. maintained on some of the largest metropolitan systems! Furthermore, only 77 per cent of the cars were on time. During the past four years the speed has been raised to 9 m.p.h., an increase of 20 per cent or one minute out of every five. While the trainmen declared it couldn't be done, the latest check showed that 95 per cent of the cars were operated on schedule. Most surprising of all, the increase took place while one-man operation was being largely extended, and while there was a marked increase in traffic congestion.

It is beside the point to argue that this required hard work. Of course it did. It required a good organization and the co-operation of every employee from the top down. The big point is that it could be done and that it was done. What is more, there is no inherent reason why similar results cannot be obtained in practically every city where the schedule speed is too low. And in the doing of it there is great reward.

Changing Conditions Affect Interurban Headlight Efficacy

PRESENT headlight equipment of interurban cars was designed principally to aid the motorman in detecting objects on the right-of-way. The headlight mounted atop the car roof may serve its primary function of illuminating the track ahead effectively for the motorman, but it is sometimes ineffective as a warning to the driver of a highway vehicle about to cross the track. The hazard of the highway crossing is one of growing seriousness, both on account of the increasing number of vehicles and in their greater speed and the apparent recklessness with which that speed is used by the driver. Conditions are worst at night, particularly when there are few vehicles on the road and they are driven at breakneck speed.

The motorist of today has learned to interpret traffic dangers in terms of light signals. With the advent of the closed types of automobiles auditory warnings have in a measure become ineffective. This is particularly true during inclement weather, when the vehicle windows are closed and the noises of the wind tend to mask the sound of a warning signal. Lights guide the motorist through the complexities of city traffic, and on the highway lights produced directly or by reflection mark road curves, S turns and other danger spots. They flash a visual message that is unmistakable in its import.

Under certain conditions the beam from the headlight on the roof of an interurban car may be out of range of the motorist's vision. Observation of cars approaching highway crossings at night under varying roadway conditions indicates the need for giving more careful consideration to the position of headlights on the interurban car than has been paid to the subject in the past. On some properties cars which use a brilliant headlight on the roof also carry a second headlight on the dash. In such instances the practice has been adopted rather to meet the conditions of operation on city streets than those presented by highway crossings on the open road.

In view of the increasing seriousness of the crossing hazard, this matter of headlight equipment for interurban cars seems worthy of serious study.

Prudent Stewardship Indorsed

CONFIRMATION of the disposition of its earnings has been rendered in favor of the management of the Third Avenue Railway, New York, by the United States District Court. In some respects the issues raised in this case appear to be purely academic, but they are, on the whole, much more than one for the technician. They relate to the rights of the management to retain funds which a holder of income bonds thought should have been applied to the payment of interest, accumulated to the extent of 27¾ per cent as of Sept. 24. The man who sued sought to estop the company from using the property of bondholders for capital purposes "in direct violation of the trust indenture securing the bonds." The management said that the indenture provided that disbursements on the bonds were at the discretion of the directors. Briefly, the position of the management was that it was acting fully within its rights when it withhheld payment of interest so as to conserve its cash for use in the emergency of the ever-changing railway situation in New York, but particularly to meet the contingencies before it in the franchise applications then pending for the right to run buses in the city.

The court has now held that the management did right in acting as it did. The court apparently did not pass upon the terms of the indenture under which the bonds are secured, but the ruling is no less clear on that account. Judge Knox held, in effect, that the company's position in the premises was justified, since with the bus lines in the hands of an antagonistic company the routes of the railway and the bus company would have been sharply competitive. The decision, however, is not one that might be construed as conferring upon companies having income bonds outstanding the right to pay or withhold interest at will. That was never the original intention of the income bond as a financial device, and any such construction would indeed be detrimental to the income bond as a very valuable form of financial media. The court merely ruled on the specific points raised, saying that the accounting sought by the plaintiff might show facts which would entitle him to relief, but that it was not satisfied, upon the basis of the present disclosures, that the plaintiff should have the injunctive relief he sought.

It would seem reasonable to assume, as has been pointed out before, that the holder of a security of this kind labors under no delusion about the type of security he is purchasing. He knows that financially its owner-

ship implies hazards, and those hazards are lessened for him only as the management exercises caution. It might, it is true, seek as soon as possible to liquidate any payments that have accumulated and denude the property of cash so quickly as to leave it again in a position out of which grew the necessity for issuing the income bonds. If it did that knowingly it would not be true to its trust.

Under the circumstances in the Third Avenue case, it does not appear that any decision could have been reached other than that arrived at by the court. Certainly the management in this case was acting in the remote interest of the owner of the bond and in so doing was protecting him and his capital. The withholding of the interest payment was merely incidental to the larger and more important one of preparing the company to cope with a situation that arose. The attitude of the company toward the proposition was well advised, as the court ruling indicates.

Car Rider's Viewpoint Not Always Properly Understood

MANY managers of electric railways find that one of the most successful means of providing the service that the public wants is to put themselves in the place of their patrons. In other words, the executive of the company himself becomes a regular passenger on his own cars. Sometimes the plan is carried even farther, and members of the organization not directly connected with car operation are delegated to ride and to report on the desires of the public as well as possible sources of irritation and plans for their elimination. When this plan is followed it tends definitely to keep the management away from the frame of mind where the officials feel that they know instinctively what is best for the public, and propose to run their own roads regardless of what the riders think they want. When a plan of this kind is followed it may make for efficient operation. But there is more than mere efficiency to operating a transportation system successfully. The service must also be convenient and comfortable.

At times the requirements of efficiency in operation and passenger convenience conflict with each other. Then accurate knowledge of the car rider's viewpoint is indispensable. Determination of the correct procedure under such circumstances cannot safely be left to subordinate operating men. While the efficiency—or the lack of it—becomes a matter of record, the effect on public opinion is not definitely registered. For example, a car turned back short of its regular destination to fill in a gap in the opposite direction shows up well on the headway record for the day. But there is no way to chart resentment of the passengers compelled to change cars. Similarly, running by waiting patrons may tend to correct uneven spacing of cars and hence produce a good result on paper, but it produces an extremely bad effect on public relations. Even the railway manager himself would wax wroth if he stood on the street corner and was passed up by one of his own cars. Anyhow it would be worth a good deal to him to try the experiment himself and learn just how it seems.

These efficiency measures usually are adopted in the name of "the greatest good for the greatest number." In many instances their claim to accomplish that result is justified. But the individual passenger cares nothing about "the greatest good for the greatest number." He is thinking only of the greatest good for himself. One incident that inconveniences him makes a deeper impression than ten that benefit him. Often other corrective measures can be taken that will not discommode the patrons of the road. When it is necessary to discommode them, every effort should be made to inform them of the reasons for a change from normal operation. By so doing many a friend can be made—and in these days good will of the public, while hard to evaluate, is no mean asset.

An Obligation That Should Not Be Assumed Lightly

CONSIDERABLE attention has been given in recent months to plans for pensioning superannuated employees in all classes of American business. Irrespective of the desirability on social or moral grounds, it is a movement that has been gaining favor in many places. Looking at it in a dispassionate way, it is merely a plan to force the employee to save systematically whether he will or not. As it was pointed out in the article in this paper for Dec. 3 by E. C. McDonald, the plan is largely one for the actuary. With the same accuracy with which life insurance premiums can be calculated, it is possible to determine the amount that should be set aside each year to provide the needed fund at the retirement age to make payments to the beneficiary for the remainder of his life. There is no magic in it and virtually no guesswork.

When such an obligation is taken on by the employer, by the employee or both, it is necessary to be certain that it can be carried through without fear of failure. Of course, every cent that is set aside is saved, and nothing is lost, if the money is invested in such a manner that safety of principal is assured. It is when questions come up such as those raised in Australia, which were presented by W. O. Strangward, secretary of the Melbourne and Metropolitan Tramways Board, that a shadow of doubt arises whether both parties to the contract will be able to fulfill their obligations.

Mr. Strangward points out that the contribution of the company is really equivalent to deferred wages, and since it must come out of fares, it is doubtful if the rates can be raised sufficiently to produce the needed revenue. It is wrong to agree to the payment unless the accruals cover the entire term of service of the employee, as to defer them would be merely passing on to a future generation the duty of paying the employee, and would at that time make the burden so great that it might be irksome. Even when the payments are made from the beginning the amount is so great that it may cause distress.

In fact, in Australia itself the question of failure to accrue funds sufficient to care for pensions has already become apparent. For instance, in New South Wales the amount to be raised annually from employee contributions has been reduced greatly and the deficiency is to be made up by the state. Even though the plan has been in effect only a little more than ten years, the government is short by some £2,000,000 to £3,000,000, and is planning to refund the arrears over a long period of years.

In view of a situation such as this the greatest care should be taken before a pension system is undertaken. It must be fundamentally sound or it will be impossible to carry it through. Furthermore, the employee should be given to understand that it really is a plan to assist him in emulating the ant and not the grasshopper.



One of the ten new interurban cars purchased in 1926. By popular vote it was named after a veteran conductor on the line who had recently died





The seats on the "Peter Caldwell" are of the individual type, upholstered in real leather. The smoking compartment is shown at the left



Here are 80 old type split frame heavy motors which were retired from service. Their aggregate weight is 111 tons. They were replaced by modern motors having an aggregate weight of 55 tons or approximately 50 per cent of the former weight

Atlanta Builds for the Future

With New Cars and Better Service

Convinced that modern equipment and improved service will ultimately win public patronage and support, the Georgia Power Company, in its brief for the Coffin Award, outlines the courageous policy that has finally brought an upturn in the earnings on its investment



Atlanta is doing more than its share to get rid of the 25,000 obsolete cars. Since 1921, 178 cars have been retired, 176 burned and two given away

CONFIDENT that new cars and, therefore, better service are the real answer to increased revenue and the ultimate support of the public, the Georgia Power Company, Atlanta, Ga., and its predecessor company, the Georgia Railway & Power Company, have been buying cars steadily since 1921, in the face of a declining curve of earnings on the investment. Some idea of the extent to which the present company believes in better service is gained from the knowledge that it has spent over five million dollars in service improvements since 1921, and the budget for 1927 will add more than a million and a quarter dollars to that already invested.

The present operating exceutives took charge in 1921 and almost immediately purchased 33 cars, followed in 1922 and 1923 by orders for twenty cars during each year. In 1925 sixteen new units were added and the following year saw seventeen additional new cars in service, bringing the total to 203 cars in 1926. As recently announced in ELECTRIC RAILWAY JOURNAL, the company placed an order this spring for 40 more units, which will bring the new equipment total to 243 cars purchased over a period of seven years.

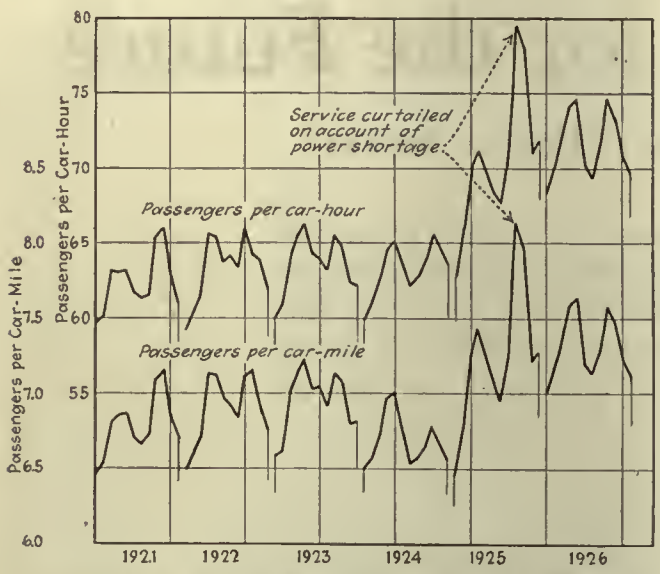
The 1926 car orders place the Georgia Power Company in the position of having purchased nearly 2 per cent of all of the new passenger cars for city use that were bought in the United States during the last six years. The extensive car purchase program and the retirement of 178 old units has reduced the average age of the passenger equipment from 13.6 years in 1921 to 8.6 years in 1926.

The schedule of retirement of old cars, most of which were more than twenty years old, is as follows:

Years	Number of Cars Retired	Years	Number of Cars Retired
1921	10	1925	60
1922	..	1926	76
1923	20		
1924	12	Total	178

With the retirement of fourteen old cars this year and the placing in service of the 40 cars scheduled for delivery in September, the average age of all cars, city and interurban, will be 7.4 years. For the city cars only the figure is 7.7 years. This contrasts with the following figures: Dec. 31, 1921, 13.5 per cent of the cars in service were less than five years old. On Dec. 31 this year the rolling stock less than five years old, 210 cars out of 449, will be 46.75 per cent of the total on the property.

Some of the tangible results of the improvements made in Atlanta may be seen from a review of operating and revenue statistics which show the company's unswerving faith in its policy of concentrating on improved equipment and better service as the means of winning



There has been an increase within recent years in passengers per car-hour and per car-mile

public patronage despite the fact that until 1926 revenues showed a downward trend. The per cent return on value of property from 1922 to 1926 follows:

1922	3.03	1925	1.32
1923	2.70	1926	2.34
1924	1.87		

From this it will be seen that the company lost ground steadily from 1922 to 1925, but that there has been a sharp upward trend in the return on the investment between 1925 and 1926, with the promise of a further climb during the present year.

Passenger Riding Increased

The record of passengers carried indicates the wisdom of the company's policy. The total number of passengers carried in 1926 was 96,794,273, as against 91,358,379 in 1921. Revenue passengers increased from 73,611,786 in 1921 to 75,901,241 in 1926. Taken by years, the total passengers carried were as follows:

1921	91,358,379	1924	92,029,437*
1922	92,172,664	1925	94,636,746
1923	95,357,117	1926	96,794,273

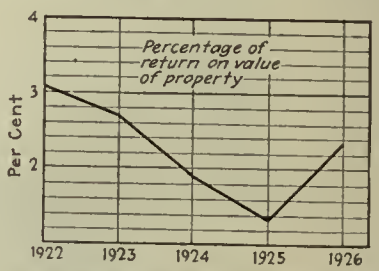
*Jitney competition.

The company's statement of gross revenue, total operating revenue, total operating expenses and net operating income before taxes for the years 1921-1926 inclusive are given in the accompanying table.

On the fourteen lines in Atlanta, where obsolete cars have been replaced by new cars, there has been an average increase in patronage of 4.73 per cent within three to six months following the installation of the units in service. The average increase on the balance of the system during this period was only 0.772 per cent. In the matter of increased riding as the result of new cars there is cited one route on which the installation of the new cars was followed by a business increase of 21.4 per cent for six months as compared with the corresponding period in the preceding year. On another route 13.5 per cent increase was obtained, while the system increase was 1.8 per cent. Increases of about 13 and 12 per cent, respectively, are shown on two other routes following the installation of new cars.

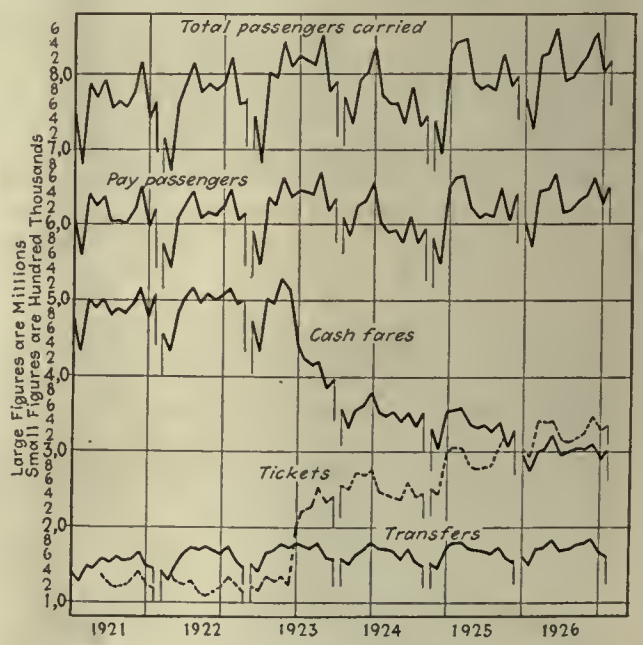
One-Man Cars Successful

When making its new car purchases the Atlanta company determined to give the one-man car a thorough test, a decision that has been productive of splendid results, both from the standpoint of increasing the car men's wages and solving the great Southern problem of race separation. Reduction of accidents also is attributed to the introduction of this type of car, which the company placed in service during 1925.



The percentage return on the value of the property is tending upward

At present 110 units in operation are arranged for one-man operation and the 40 new cars to be delivered this month are of this same type. Twenty additional cars which permit of ready conversion to this type will be changed during this year. One-man operation is used on all interurban lines and during rush hours 32 per cent of the service is of this nature. The management has found a $1,700 per car annual platform expense saving in one-man operation over two-man operation. After deducting interest charges and depreciation, approximately $720 per car per year has been saved. This



The line showing pay passengers carried has had a slow but continuous growth

GROSS REVENUE, OPERATING EXPENSES AND INCOME, 1921-26, GEORGIA POWER COMPANY

	1921	1922	1923	1924	1925	1926
Gross revenue from transportation	$5,160,784.85	$5,106,816.38	$5,244,204.79	$5,043,959.27	$5,134,918.60	$5,257,314.73
Total operating expenses	3,536,691.18	3,680,186.48	3,834,575.28	3,767,554.67	3,867,033.58	3,893,125.01*
Net operating income before taxes	1,624,093.67	1,426,629.90	1,409,629.51	1,267,404.60	1,267,885.02	1,364,189.72

* Includes $129,459.05 retirement expense and $43,500 rental of equipment, a total of $172,959.05 not charged to operating expenses in previous years.

saving is allocated to give 50 per cent to the public in additional service, 25 per cent to operators in increased wages and 25 per cent to the company in increased earnings.

Every one familiar with the race question in the South knows that it is difficult, especially where congestion is present. The one-man cars adopted by the Georgia Power Company have the treadle step rear door mechanism. This has reduced race contact materially and has brought forth unqualified praise. With rear door operation there is no definite dividing line separating sections of the cars to be used exclusively by each race. The practice is for the negroes to occupy the seats from the rear forward, and the white patrons vice versa. Although at first it was found that the one-man type was productive of more accidents, familiarity of the public and trainmen with the new cars has grown to such an extent that in April, 1927, accidents on one-man cars were just about equal to those on two-man cars.

Perhaps one of the most interesting phases of the one-man situation in Atlanta was the lack of opposition encountered when this type of unit was first placed in service. The company took a novel means of introducing them to the public. This consisted of a contest to decide what color scheme the public liked best. Two of the cars were painted in the proposed new colors, green and cream and red and cream. One of the older cars was painted in solid green, the former color standard. These sample cars were placed in front of the company's building and the public was invited to cast ballots, the result being that more than 20,000 ballots were cast for the green and cream color scheme.

Among the 203 new cars purchased since 1921 are 100 double-truck, four-motor safety cars, with safety air brake equipment, door engines and treadle mechanism.



Car stop sign, with information on routes passing that point, attached to buttress of loading platform

There are 40 double-end cars with automatic couplers and air brake equipment for two-car-train service. Ten cars are of the single-end safety type with automatic couplers and air brake equipment for two-car-train service. Another twenty units are double-truck, double-end, two-man cars with straight air brake equipment and equipped with door engines and pneumatic control.

Replacement of ten old type interurban cars with lightweight one-man cars brought about a total reduction in car weight from 315 tons to 189 tons. All the new units



The low-floor, front-entrance type of one-man car which was recently put in service

have cheerfully finished interiors, wide aisles and thermostatic heat control. In the new interurban cars the de luxe appointments are much in evidence. Besides leather-upholstered individual seats the cars are provided with smoking compartments, generously upholstered arm rests, foot rests, dome lighting, parcel racks and ticket holders. On both the city and interurban units the side sheathing and door pockets are insulated with cloth and covered with canvas as a noise prevention feature.

With the exception of the cars purchased in 1921 all of the units have 26-in. wheels, insuring a comfortable step from the street level. Cars purchased in 1925 and 1926 and those now on order are of the same general design with the exception of twenty of the 1925 order, which were so designed as to make them easy of conversion to one-man operation. The popular type car in Atlanta is a 48-passenger, 46-ft. x 8-ft. car with 50-in. front door opening and 32-in. rear door opening. Electrical equipment consists of 35-hp. motors, K-75 low type control, line breakers and safety air brakes. The new interurban cars seat 52 passengers and weigh 37,800 lb. They are double-truck, four-motor units and have PC multiple-unit control for train operation and are equipped with Tomlinson couplers. The two-car trains have a seating capacity of 111.

This rolling stock serves a city system of 21 routes, thirteen of which are through routes. The remaining lines terminate in the downtown business district. In all, the Georgia Power Company operates 114 one-man cars, 239 two-man cars and 22 trailers in regular passenger service. It has a reserve of 26 single-truck cars, 24 double-truck open units for baseball and other special services, bringing the total to 425 units. This is exclusive of the 40 one-man cars now being constructed. Two interurban lines are operated, one to Stone Mountain, Ga., the

site of the gigantic Confederate memorial; the other, the Atlanta Northern Railway, runs to Marietta, Ga. There are 85.817 miles of double track and 49.919 miles of single track in Atlanta. The Stone Mountain single-track line is approximately 10 miles long with turnouts. On the line to Marietta there are slightly over 14 miles of single track and a mile of double track.

Service Improved by Faster Operation

Several measures for evaluating the service improvements in Atlanta are available. In 1923 the average speed in miles per hour was 9.18 as compared to 9.77 m.p.h. in 1926. There has been an increase in the average operating speed from 9.47 m.p.h. in 1923 to 10.5 m.p.h. in 1926. As a corollary to the increase in speed there has been a marked reduction in schedule failures. In 1926 the loss from schedule speed was 4.54 per cent as compared with 8.63 per cent in 1923. The following tabulation is of interest:

OPERATING SPEEDS IN MILES PER HOUR, GEORGIA POWER COMPANY

	1923	1924	1925	1926
Revenue operating speed	9.47	10.00	10.47	10.50
Schedule speed	9.28	9.54	9.78	9.81
Actual speed	9.18	9.45	9.73	9.77
Loss from schedule	0.10	0.09	0.05	0.04
Per cent of loss from schedule	8.63	9.45	5.12	4.54

Again, the effect of better and more up-to-date cars was a substantial increase in the total seat-miles and in the average seat-miles per car-mile.

SEAT-MILES OPERATED, GEORGIA POWER COMPANY

	Total	Per Car-Mile
1921	506,283,880	37.55
1922	501,245,891	37.50
1923	516,894,356	37.70
1924	527,855,915	38.30
1925	525,528,959	40.30
1926	573,757,570	43.33

Improved equipment in Atlanta brought about a large decrease in service interruptions resulting from pull-ins. The car-miles per pull-in in 1926 were 26,041, as against 3,002 in 1921, and the average number of daily pull-ins last year was 1.39, compared to 13.2 in 1921. An important factor in getting these results is a rigid inspection and overhauling program maintained by the equipment department. The criterion for overhauling is the life of the armature bearings. Cars with Westinghouse No. 68 and GE-67 motors are overhauled every 40,000 miles. Those with Westinghouse No. 101, 306, 307, 514 and GE-80 every 50,000 miles and units with Westinghouse 548, GE-201 and GE-265-A are overhauled every 60,000 miles. Overhauling is extended to controllers, line breakers, trolley bases, resistance cables, governors, door engines and circuit breakers, which are checked up and cleaned.

Little Rock Issues Time-table

WHILE the Little Rock, Ark., electric railway is primarily a street car system without long interurban connections, it has published a time-table of its various routes, grouping separately the weekday, Saturday and Sunday schedules, and giving as well the running times and time points. A sample of this time-table and reference to it are contained in the brief of the Arkansas Power & Light Company presented for the 1927 Coffin Prize. The schedule was issued on Feb. 15, 1927, and 25,000 were published. Distribution was made through operators and at cashier windows where street car tokens are sold.

Pictures of places of interest are shown in the booklet for the benefit of sightseers. They include the old State House, the new State Capitol, the Missouri Pacific station and the Memorial Bridge across the Arkansas River. The schedule has created much interest and has proved valuable to many patrons.

Unusual Acts to Improve Public Relations

DEVELOPMENT of ways for improving public relations and keeping in touch with public sentiment have been a feature of electric railway operation during the past decade. Various methods are now recognized as being of "the passenger be pleased" character. The brief of the El Paso Electric Company, El Paso, Tex., for the 1927 Coffin Prize shows that in addition to the standard ways it has developed a number of special methods of pleasing its patrons. A brief account of some of the more important of these follow:

The company's telephone operators are trained to answer inquiries intelligently and in a pleasing manner. Their training includes trips to all the company departments to acquaint them with those employees who use the telephones, how these departments function and the location of each branch phone. When a doubt exists as to the proper department to handle an incoming call, the operator determines this by a polite inquiry. When the right branch is not obtained at first, the employee who receives the call has it switched to the proper line.

If the company receives a complaint the investigation of which requires some time a special delivery letter is mailed acknowledging the receipt of the letter. This is later followed by a friendly visit to the individual making the complaint. Personal calls, in fact, are made in almost every instance regardless of the seriousness of the complaint, as this is found productive of the best results.

Last year on Christmas morning operators handed Christmas greeting cards to all passengers. The men took a genuine pleasure in doing this and awakened a similar feeling of good will toward them on the part of the public.

An inspection and information booth has been located in the heart of El Paso's downtown district. Last year the average number of inquiries made at it each day were about 400. Booklets are available here, as well as elsewhere, showing a map of the street car lines and bus lines, with the special feature that the house numbers in the different blocks are marked on all streets. This feature has attracted special popular favor because it supplies accurate information elsewhere not readily accessible.

Where a passenger drops too much money in the fare box, the operator is authorized immediately to refund the over-payment. Later he gets the money back from the division inspector.

Operators carry blanks called "Better Service Slips" on which they enter any comments they hear about the company and its service and forward them to the manager's office. Complimentary comments as well as those that are uncomplimentary are reported. They not only help the management to keep in touch with the opinions of the patrons but they are a powerful incentive to all employees to exert every effort to render the best possible service.



Looking up the Avenue des Champs Elysées toward the Arc de Triomphe. This is one of the fine broad avenues in Paris. The raised platforms are for the benefit of pedestrians crossing the street

Paris Revises Street Railway and Bus Franchise

City makes changes in the method of calculating the bonuses for good management and economy of the local bus and street railway company

By Henry W. Blake
Senior Editor *Electric Railway Journal*

CHANGES have been made this year in the franchise under which the Société des Transports en Commun de la Région Parisienne operates the electric railway and bus lines in Paris. The authorities awarding the franchise were those of the Department of the Seine, in which Paris is located. The decree officially putting this franchise in force was issued on April 20, 1927. The changes from the previous franchise relate principally to the remuneration of the company for operating the system. The previous contract was dated Sept. 20, 1920, and was modified Feb. 7, 1925.

The theory on which the franchise, or leasing contract, is based is that the Department of the Seine is the owner of the property, having taken it over from the original proprietors, nine former operating companies. Their interest in it is being liquidated through annual payments by the department.

In the meantime the department has hired the S.T.C.R.P. to operate the property for a sum made up in part of interest on the investment which the S.T.C.R.P. has had to make and in part on a share in the earnings of the property. The company operates not only the bus and street railway lines in Paris and to some extent in the suburbs, but also a small steam suburban railway and a line of passenger boats on the Seine, engaged in local transit service. The steam railroad line and the boat line are not large portions of the company's business. It does not operate the rapid transit lines in Paris, those being

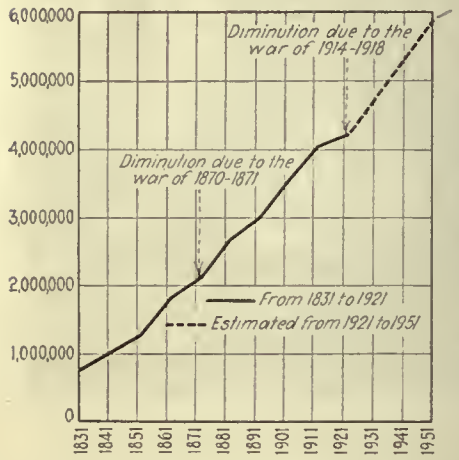
TABLE I—ANNUAL OPERATING REPORT OF S.T.C.R.P. FOR 1926 WITH RESULTS AFTER AMORTIZATION CHARGES

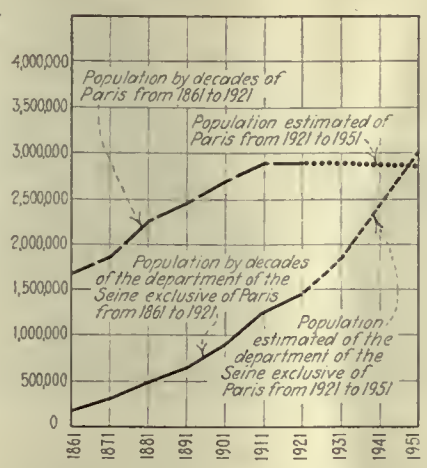
	Francs	Dollars
Passenger operating revenue (cars, buses and boats)	538,947,120	$21,557,885
Freight operating revenue	7,072,361	282,894
Miscellaneous operating revenue	5,905,008	236,200
Total operating revenue	551,924,491	$22,076,979
Operating expenses	552,245,542	22,089,821
Net revenue from operation (deficit)	321,052	$12,842
Fixed charges (including interest and amortization of purchase money and first cost)	81,854,031	3,274,161
Deficit of system	82,175,083	$3,287,003
Remuneration paid to company for operation	12,886,897	515,476
Deficit of department	95,061,980	$3,802,479

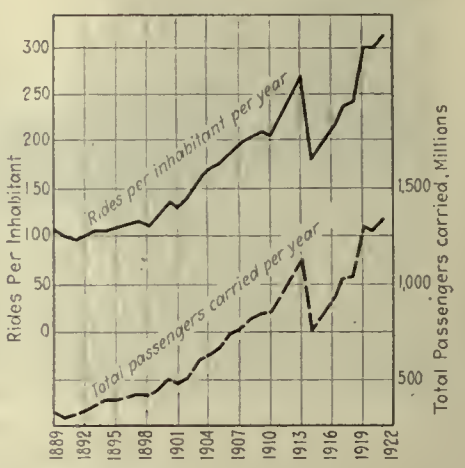
TABLE II—PROFIT AND LOSS STATEMENT FOR 1926 OF S.T.C.R.P.

	Francs
Balance from previous year	221,480
Interest at 6 per cent paid by department on capital stock	3,600,000
Operating bonus earned under contract	4,149,586
Economy bonus earned under contract	5,137,311
Miscellaneous receipts	251,397
Operating revenue	13,359,774
Corporate operating expenses and sinking fund payments of company	4,745,609
Gross income	8,614,165
Amount payable to department as its proportion of profits	1,376,390
Net income of company	7,237,775

Note: 1 franc taken as equal to 4 cents.







These charts show population and other data of Paris and the Seine Department

The chart at the left gives the population in the Department of the Seine by decades. The one in the middle gives the same figures since 1861, divided between Paris itself and the districts in the department outside the city limits. It will be noticed that during the decade 1911 to 1921 the population growth has been entirely outside the city and this condition is expected to continue. By 1951 it is expected more people will live outside rather than inside the city. The chart at the right gives total passengers carried and rides per inhabitant for the Department of the Seine by years since 1889.

operated by entirely different interests under a different group of franchises.

Under the contract which has just been superseded the remuneration of the company was made up of three elements, as follows:

1. Six per cent on the capital stock of the company, which is guaranteed by the department.

2. A so-called "good management" bonus, amounting to ¾ per cent of the gross receipts.

3. A so-called "economy" bonus, which has consisted of 4 per cent of the amount by which the receipts exceeded 65 per cent of the expenses. In other words, if the receipts should be represented by R and the expenses by D, this remuneration normally would be represented by the formula $0.04\ (R - 0.65D)$. This bonus, however, was subject to a decrease on a graduated scale if it should exceed 0.85 per cent of the receipts. Moreover, when the earnings of the company should be sufficient to permit of the distribution of a dividend exceeding 8 per cent half of the excess amount had to be paid to the department. If the dividends exceeded 10 per cent three-quarters of the excess had to be paid to the department.

The department was also entitled to certain other deductions from the receipts for payments to its reserves.

Under the new franchise the payment of interest at 6 per cent on the company's stock is retained, but a new clause takes the place of those relating to the former good management and economy bonuses. There is only one bonus and it is 0.9 per cent of the ratio of the receipts to the expenses, multiplied by the receipts. That is to say, it may be represented by the formula $P = 0.009\ (R \div D)\ R$, where R represents the total receipts and D the operating expenses including taxes, plus certain other charges mentioned in the franchise.

This method of calculating the bonus, it will be seen, embodies the principles of both of the former bonuses, i.e., it encourages an increase of receipts, the former "good management" bonus, and also a low operating ratio, the former "economy" bonus.

The franchise strictly defines what shall and shall not

TABLE III—STATISTICS OF S.T.C.R.P. FOR 1926

Kind of Service	Vehicle-Miles or Kilometers Miles	Kilometers	Passengers Carried	Total Receipts Francs	Dollars	Receipts per Vehicle Francs per Km.	Cents per Mile
Tramways, electric	99,969,076	83,307,563	687,630,655	337,776,850	$13,511,074	3.379	21.626
Tramways, steam	1,888,393	1,180,246	1,734,055	3,357,753	13,431	1.778	11.379
Total tramways	101,857,469	63,660,918	689,364,710	341,134,603	$13,645,384	3.349	21.434
Motor buses, day service	53,712,345	33,570,215	332,116,486	194,337,564	7,773,503	3.618	23.155
Motor buses, night service	118,381	73,988	337,176	739,191	29,568	6.244	40.062
Total buses	53,830,726	33,644,204	332,453,662	195,076,755	$7,803,070	3.624	23.194
Boats on the Seine	282,488	176,555	2,879,833	2,619,885	104,795	6.850	43.840
Miscellaneous passenger receipts (supplementary fares, etc.)	.....	.....	.....	115,887	4,635	.....	.....
Freight and package service	.....	.....	.....	7,072,362	282,894	.....	.....
Grand total	156,070,683	97,844,177	1,024,698,205	546,019,482	$21,840,779	3.499	22.594

TABLE IV—STATISTICS, 1911 TO 1926, INCLUSIVE, OF TRAMWAYS AND BUSES IN PARIS

Year	Tramways Car-Kilometers or Car-Miles Car-Kilometers	Car-Miles	Passengers Carried	Passenger Receipts in Francs	Omnibuses Bus-Kilometers or Bus-Miles Bus-Kilometers	Bus-Miles	Passengers Carried	Passenger Receipts in Francs
1911	75,050,491	46,906,557	433,985,880	56,557,428	27,372,348	17,107,717	135,722,473	20,631,392
1912	76,997,481	48,123,426	450,604,011	59,213,692	33,669,598	21,043,499	205,945,280	27,516,097
1913	82,037,047	51,273,154	485,816,631	62,306,237	38,582,155	24,113,847	246,242,644	34,785,313
1914	70,243,643	43,902,277	438,952,347	55,897,862	23,356,028	14,597,517	151,919,20	21,344,558
1915	59,186,217	36,991,386	403,685,326	51,933,335	.....	.....	.....	.....
1916	65,756,437	41,097,773	481,996,737	61,796,411	779,172	468,982	8,315,300	1,209,344
1917	63,070,369	39,418,981	516,150,266	67,132,548	1,738,703	1,086,689	19,862,443	2,892,609
1918	59,919,609	37,449,756	522,667,881	68,766,124	3,016,092	1,885,057	31,601,709	4,711,248
1919	71,271,056	44,544,410	598,109,481	107,209,028	10,963,320	6,852,075	95,420,364	19,155,420
1920	79,598,092	49,748,807	605,778,933	161,243,333	22,072,911	13,795,569	165,984,957	50,787,283
1921	90,526,381	56,578,988	636,365,516	186,849,412	35,219,814	22,012,384	245,874,430	82,575,818
1922	93,202,943	58,251,839	635,592,912	193,534,666	43,210,149	27,006,343	290,146,147	104,246,917
1923	99,375,804	62,109,877	694,827,609	208,932,188	50,270,827	31,419,267	337,503,838	121,812,738
1924	99,816,172	62,385,107	723,153,749	237,485,002	54,218,608	33,886,630	356,529,851	143,776,368
1925	102,790,625	64,244,141	720,279,679	271,295,119	53,501,626	33,438,516	344,800,583	157,056,980
1926	101,857,469	63,660,917	689,364,710	341,134,602	53,830,726	33,644,204	332,453,662	195,076,755

be considered operating expenses, and certain administration expenses, as well as certain corporate expenses not connected with operation, are not to be included.

Certain other payments, including those necessary to amortize within 30 years the company's capital stock of 60,000,000 fr., are made out of a separate allowance received from the department.

The bonus so earned is subject to deductions should it amount to 5,000,000 fr. a year. These deductions might be considered as a form of profit sharing with the department. The amount thus to be paid to the department is as follows: Twenty per cent of the bonus if it amounts in any one year to between 5,000,000 fr. and 8,000,000 fr.; 30 per cent if it is between 8,000,000 fr. and 10,000,000, and 40 per cent if it is more than 10,000,000 fr.

The bonus is also subject to a discount in any year in which there is a deficit from operation. This deduction is to be a percentage of the bonus already mentioned, $0.009\ R^2 \div D$, the percentage being calculated according to the formula $0.5\ (D - R) \div R$, in which D, as before, represents expenses and R represents receipts, D being greater than R, as this formula applies only when there is a deficit from operation. But this deduction from the bonus has a limit as it cannot be more than 20 per cent of the bonus otherwise earned. In other words, when there is a deficit, the bonus becomes $P^1 = P\ [1 - 0.5\ (D - R) \div R]$ except that P^1 can never be less than $0.80\ P$.

This provision does not affect in any way the deductions already mentioned where the bonus, however calculated, amounts to 5,000,000 fr. a year or more.

There are other changes to clauses in the contract, but it is believed that those mentioned are of the most general interest.

The employees continue to receive a bonus of 4 per cent of the gross receipts in addition to their wages, as formerly, but as this bonus is included in operating expenses, it does not affect the remuneration of the company.

The operating report of the company for the calendar year of 1926 is shown in Table I. Compared with the 1925 figures, those for 1926 show an increase in total operating revenue of 110,002,240 fr., an increase in operating expenses of 82,024,968 fr., a reduction in the deficit from operation of 27,977,272 fr. and a reduction in the final deficit to the department of 35,439,289 fr. Part of this better showing was undoubtedly due to an increase in fare of about 25 per cent which went into effect in August, 1926.

The profit and loss statement of the company is given in Table II.

From this sum of 7,237,753 fr. for surplus for the year, after payment to reserves, directors' fees and the interest at 6 per cent mentioned above, a dividend of 4 per cent was declared on the capital stock. This dividend (with the 6 per cent interest already mentioned) made 10 per cent paid on the capital stock.

Some general statistics of the company's service are given in Tables III to V. In Table IV the low figure for the buses during 1917, 1918 and 1919 are due to the building up of the bus service during these years following its disorganization during the war. During 1911, 1912 and 1913 the bus receipts were from 37 to 50 per cent of the tramway receipts. On Aug. 2, 1914, all the Paris buses were requisitioned for military purposes and operation ceased. It was not until June 1, 1916, that the bus service began to be resumed and it was not until 1925 that full service recommenced.

The financial figures in these tables as well as the records on fare increases will hardly be understood unless the reader realizes the great increase in prices, measured in francs, which has taken place since 1914. Part of this, of course, is due to a fall in the exchange value of the franc, which in United States money was worth about 19¼ cents in 1914, but now has an exchange value of about 3.95 cents. It has been taken as 4 cents in all the accompanying tables. Table VI gives the various price index figures in France for general supplies and for the







Three steps in the evolution of the present Paris bus. Note the single rear exit and entrance in all of them and even in the horse car on page 1188

wages paid and other operating expenses as well as the fares of the Paris company.

Incidentally, it might be said that in 1926 labor accounted for 64.4 per cent of all the total operating expenses of the company, electrical energy for 7 per cent and fuel for the buses for 7.3 per cent.

For fuel the Paris buses now are using a mixture consisting of one-third gasoline, one-third alcohol and one-third petrol or kerosene. This mixture is used partly because of the high cost in France of gasoline and partly because, as alcohol is a French product, a tariff reduction is permitted on the other ingredients employed. At first the company had difficulty in keeping these three parts thoroughly mixed because of the difference in their specific gravities. This was finally overcome and the mixture now makes an acceptable fuel.

The charts on page 1186 giving population trends and



data since 1831 as well as passengers carried and rides per inhabitant in the Department of the Seine since 1889 are from an analysis of traffic conditions in Paris, made in 1926 by A. Mariage, chairman of the board of the S.T.C.R.P.

In that study Mr. Mariage pointed out that the demand for transportation in Paris in recent years had grown much more rapidly than the transportation facilities. He urged the especial need of means for satisfactorily serving the suburbs, which are increasing in population rapidly, while the population in the center of the city is about stationary.

His recommendations include preparation by the city of a comprehensive city development and transportation plan under which part of the cost of financing the necessary transportation facilities would be borne by the territories directly benefited. The transportation system, in his opinion, should include rapid transit radial service and means for local distribution, all under one management.

Physical Equipment and History of Present Company

On Dec. 31, 1926, the rolling stock of the S.T.C.R.P., the company which operates all of the buses and street railways in Paris, consisted of the following:

Electric tramways—2,291 motor cars, 892 trail cars.

One suburban steam tramway—Nineteen locomotives, 75 passenger cars, 134 freight or baggage cars, two gasoline rail cars.

Motor buses—1,268 four-wheel buses, including one trackless trolley; 51 six-wheel motor buses, 30 express type buses, 22 auto cars.

Boats—56 passenger steamers, two tugs, 68 tow boats.

The present company is the successor in handling street railway and bus traffic of nine older companies, namely: Compagnie Générale des Omnibus de Paris, Compagnie des Tramways des Paris et du Département de la Seine, Compagnie Générale Parisienne de Tramways, Compagnie des Tramways de l'Est Parisien, Compagnie des Chemins de fer Nogentais, Compagnie Electrique des Tramways de la Rive gauche de Paris, Compagnie du Chemin de fer du Bois de Boulogne, Compagnie du Chemins de fer sur route de Paris à Arpajon, Compagnie des tramways de l'Oust Parisien. Of these the first named, the Compagnie Générale des Omnibus, was the pioneer.

Omnibus Transportation in Paris Since 1828

According to the records, the first regular omnibus company organized to give local transportation in Paris was chartered in 1828. The rate of fare at first was 25 centimes, raised later to 30 centimes, and a number of omnibuses were put in service. At first they were rather scorned by the bourgeoisie, but they soon gained popularity. By 1854 and 1855 there were no less than twelve companies operating street lines and employing 3,925 horses. Various models of buses were used. The names of some of these early companies, translated into English, were General Omnibus Company, the Favorite, the Citizens, the Gazelle, the Parisian, the Classical and the Excellent.

In 1855 all of these companies were consolidated, under the name of Compagnie Générale des Omnibus (General Omnibus Company). This company received from the municipality a 50-year franchise for the exclusive right in Paris of transporting passengers and occupying the public streets for vehicles engaged in such service. Later, the life of its franchise was extended.



The horse car of 30 years ago and the modern electric car. Upper decks for passengers have been abandoned in Paris for both cars and buses

TABLE V—FARES IN PARIS, TRAMWAYS AND BUSES, 1919 TO DATE

(Fares given in centimes. 100 centimes = 1 franc

	Second Class		First Class	
	One Section	Two or More Sections	One Section	Two or More Sections
Prior to Feb. 8, 1919	10	15	15	20 (*t*) / 25 (*b*)
Feb. 8, 1919, to April 1, 1920	15	20	20	30
April 1, 1920, to Jan. 19, 1922	25	35	35	50
Jan. 19, 1922, to Jan. 15, 1924	25	40*	40	55*
Jan. 15, 1924, to Aug. 1, 1925	30	45	45	60
Aug. 1, 1925, to Aug. 1, 1926	40	60†	60	80†
Aug. 1, 1926, to date	50	75‡	75	100‡

Note.—Fares in centimes; 100 centimes equals 4 cents.
(*t*) = Tramways only.
(*b*) = Buses only.
* For two sections only. For more than two, an additional charge of 15 centimes first class and 10 centimes second class, per section.
† For two sections only. For more than two, 1 fr. first class and 0.80 second class.
‡ For two sections only. For more than two, 1.25 fr. first class and 1 fr. second class.

TABLE VI—PRICE INDEX INCREASES COMPARISON, 1914 PRIOR TO THE WAR WITH DECEMBER, 1926

(Based on 100 in 1914)

Industrial Index Figures:	
Manufactured supplies	802.0
Minerals and metals	820.0
Coal	635.0
Electrical energy	454.0
Labor:	
Wages paid by the S.T.C.R.P.	700.7
Expenses and Fares of S.T.C.R.P.:	
Bus operating expenses	453.0
Electric railway operating expenses	528.0
Total operating expenses	500.0
Fares	450.0

Note.—All prices are computed in French francs.

Some of the early types of omnibuses used in Paris are illustrated. While they differ greatly from the present buses in design, as well as in motive power, some of the features of the early buses have been retained in those which operate over the Paris streets of today. Noticeable among these features is the single entrance and exit in the rear of the bus. The Paris management believes this place for entrance and exit is safer than at the side. Its latest electric railway cars, however, have a center entrance only.

Tramway Development

Although some tramway track was built in Paris in the '60s, street railway construction on a large scale was not begun until after the war of 1870, when several lines were built by the General Omnibus Company. Later, with the assent of this company, other companies built short sections of tramways.

As will be seen from Table IV, the street railways carry about twice the number of passengers and operate about twice as many car-miles as the omnibuses. Several street railway lines have stub terminals close to the center of the business district, as at the Madelaine, Opera, Louvre and Place de la Concorde, but in the district within these points, and bounded on the northeast by the Boulevard de Sebastopol, there are no street railway lines. This restricted area is about 1 mile long and from ¾ to 1 mile wide. There is no definite policy on the part of the city authorities to expand this area of purely bus operation, though in the last few years the company has removed about 2 miles of electric railway track north of the Seine and 2 miles south of the Seine in very dense traffic sections at the request of the police department.

The street railways in the center of the city use the underground conduit and outside of the center the trolley. The underground conduit originally built in Paris was constructed under one rail, so that the slot for the conduit served also as the groove for the rail. This system had various drawbacks, especially as to switches, and all recent conduit construction has been of the center slot type.

Safety Car Brings Vital Message to Interstate Public Service Patrons

SAFETY has been made a big factor in the successful operation of the Interstate Public Service Company, Indianapolis, Ind. James Harmon, safety manager, recently chose the most dangerous time of the year to impress the company's patrons that they must be on their guard against accident. This was at the opening of the school year, when the "Safety Car" pictured left Indianapolis to visit most of the cities and towns along the line between Indianapolis and Louisville. The interior of the car was placarded with safety bulletins and shop bulletins. There was also a display of safe and unsafe articles and appliances. Safety pamphlets were distributed to the public and the prone-pressure method of resuscitation was demonstrated. Safety talks were also made before several groups.

School children received a special invitation to view the car and it is estimated that more than 5,000 men, women and children inspected it.



This car was sponsored by the Interstate Public Service Company, Indianapolis, Ind. It told its story from the capital of Indiana to Louisville, Ky.

Australian Pension Plans Discussed

Melbourne study shows that pensions cannot be paid out of fares alone. Deferring payments is a dangerous expedient

SOME striking facts regarding the cost of a superannuation fund for tramway employees similar to those already enacted for other Victorian employees or in force in other Australian states were given in connection with evidence to be presented to the state parliamentary accounts committee by W. O. Strangward, secretary Melbourne and Metropolitan Tramways Board during 1927. An abstract of his notes follows:

The New South Wales superannuation act of 1916 calls for the compulsory participation of railway and tramway employees in funds covering the retirement of men at 60 years and of women at 55 to 60 years. The pensions range from £52 ($253) to £312 ($1,516) a year.

The employee's contribution to a pension of £2 ($9.72) a week for himself and less for his widow and children ranges from 2s. 4d. (58 cents) for male employees aged 16 to about 5½ times that amount for male employees aged 60. Contributions and benefits in the case of women are considerably lower.

The act provided that in respect to future employees the state would pay as much as the employee. However, the then employees were to pay no more than the "age of 30" rate. This was to be matched by the state plus the shortage between the "age of 30" rate and the employee's actual age for pensions up to £104 ($505). So far, the New South Wales government had fallen short of its share by £2,000,000 to £3,000,000 and was planning operations whereby these arrears could be refunded over a long period of years.

The Victorian superannuation act of 1925 is similar to that of New South Wales, but the retirement ages are five years greater, which substantially reduces the cost. To get £2 ($9.72) a week for himself or less for his family, an employee pays from 2s. 1½d. (about 52 cents) a week at the minimum age of 16 up to about twenty times that amount if aged 65. Another important difference is that the state's contribution is not made to match the employee's weekly payments but is given in the form of an amount ranging from 50 to 98 per cent of the pension when it becomes payable, so that the main burden is pushed off to later years. The commonwealth superannuation act of 1922-24 is similar to the Victorian except that the maximum pension is £416 ($2,022) instead of £312 ($1,516).

Mr. Strangward pointed out the ethical injustice of the Commonwealth and Victorian plans, because pensions are really deferred wages which should not be saddled upon the next generation. In Victoria, however, the extenuating circumstances are stronger for certain historical reasons in connection with earlier pension funds.

What Pensions Would Mean to Melbourne Tramway Finance

Mr. Strangward then took up the matter of a pension for Melbourne tramway employees in accord with section 18 of the Melbourne & Metropolitan Tramways act of 1918. He felt that the board was not likely to approve any scheme based upon a postponement of present actuarial liabilities. The revenue of the governments was raised by taxation, but that of the tramways came out of fares. A further increase in fares would cause many passengers to find other means of transport, and in all probability, higher fares would not produce more revenue. Apparently, this left the imposition of a special tax on the community at large as the way to provide a superannuation fund. For this reason, the board would probably incline to the view that it must provide for all accruing liabilities out of each current year's revenue.

Pending actuarial study, and excluding about 1,000 temporary employees, Mr. Strangward submitted the following table:

	Number	Average Age	Weekly Payment*	Average Earnings*
Staff	720	40	8s. 5d. —$2.10	£312—$1,516
Traffic	3,500	36	5s. 6½d.— 1.37	255— 1,239
Shops	820	38	6s. 1½d.— 1.52	260— 1,264
Construction	100	38	6s. 1½d.— 1.52	245— 1,191
	5,140			

* At $4.86 to the pound sterling.

Based upon the principles of the Victorian act of 1925 with 65-year retirement age, the employees would contribute £80,837 and the board an equal amount, giving a total of £161,674. However, if employees in the £104 a year pension maximum class paid at the "age of 30" rate and the staff or office employees in the £130 a year class paid at the "age of 40" rate, the weekly contributions would be only 5s. 10d. (approximately $1.45) for office employees and 4s. 2½d. (approximately $1.05) for the others. This would cut the employee's share to £59,282 and raise the board's contribution to £102,392.

If the 60-year age of New South Wales were used, the employee's half in the first calculation would be £221,468 a year; and in the second or fixed-age contribution scheme, £77,235, with £144,233 a year to come from the board. The cost of the scheme would be slightly reduced through lower costs and obligations for women but would be higher than estimated, since many employees would be under 30 years of age.

Existing Scheme of Retirement Allowances

In 1923, the board made this provision: An employee of at least ten years' service who retires at the age of 60 years, or the widow or children under 16 years of age of an employee of such service who dies after reaching 55 years, receives a lump-sum gratuity from the board based upon two weeks wages for each year of service since July 1, 1910, with a maximum equivalent to 39 weeks' salary or wages. This is a voluntary allowance, and employees do not contribute to its cost. It averages about £5,000 per annum.

Mr. Strangward also called attention to the commonwealth invalid and old age pension acts which grant a pension of £1 ($4.86) a week to employees who have reached the age of 60 if permanently incapacitated or else those who have reached 65. The employee makes no direct contribution to this fund. Accident and illness cases are also under this fund. Receipt of a tramway pension of £104 a year would debar unmarried persons from the £52 a year of the commonwealth pension. However, if a husband and wife are each entitled to claim old-age pensions, the receipt of the £104 tramway pension (if such be their sole income) would operate to reduce their old-age pensions to 12s. 6d. (about $3.10) a week each. This means that tramway employees who may become qualified to obtain the commonwealth pension would in many cases obtain no increase in their total incomes because they had participated in the suggested tramway superannuation fund.

Illinois Central Has Steadily Improved Its Suburban Service*

By W. M. Vandersluis
Electrical Engineer Illinois Central Railroad, Chicago, Ill.

EXACTLY 70 years after the first steam suburban service was started in Chicago by the Illinois Central Railroad three electric trains were operated each way in the local service between Randolph Street and Hyde Park. Beginning with the second week 80 trains were operated each day and in the period of about five weeks the electric service was built up to more than 350 trains. These were all operated, of course, on the existing steam time-table, as there was still a considerable number of steam trains in the service.

The first electric time-table was put in effect on Aug. 28, with a total of 396 revenue trains. On account of a shortage of new equipment it was still necessary to run six trains by steam, but these were confined, so far as possible, to those carrying shop employees.

Today 470 revenue trains are being operated on a normal weekday. In addition there are fourteen equipment trains and 72 Chicago, South Shore & South Bend trains, the latter being operated between Kensington and Randolph Street. This is a total of 556 electric trains. Electric service was put in effect with no serious accidents or interruptions and has continued so during the first year. Because all of the motor-trailer car units are uniform in design and in operating characteristics, the preparation of time-tables and the handling of equipment at terminal points has been greatly simplified.

Fig. 1 shows by months the revenue passengers carried, the car-miles and hundreds of seat-miles operated and the weekday trains in service.

Improved Service With Electric Operation Due to Higher Speed and Reliability

Of particular interest is the improvement in running times due to electric operation. The latest electric time-table shows decreases in running times over the old steam service of from 11 to 28 per cent for the various classes of trains, the larger percentages resulting for trains to Kensington and beyond. The decrease in over-all time results from high maximum speeds and by the use of high accelerating and braking rates. Acceleration is at the rate of 1½ m.p.h.p.s., which is about six times as rapid as that of through passenger steam trains. Under normal operation a train will reach a speed of 28 m.p.h. in twenty seconds. After that point the rate of acceleration falls off, but on level tangent track a train will reach a speed of 50 m.p.h. in two minutes. With present average voltage conditions, balancing speed is about 64 m.p.h. Comparatively high braking rates have been effected on the steam trains, but these also have been increased on the electric trains, which brake at the rate of 1¾ m.p.h.p.s. It is significant that large

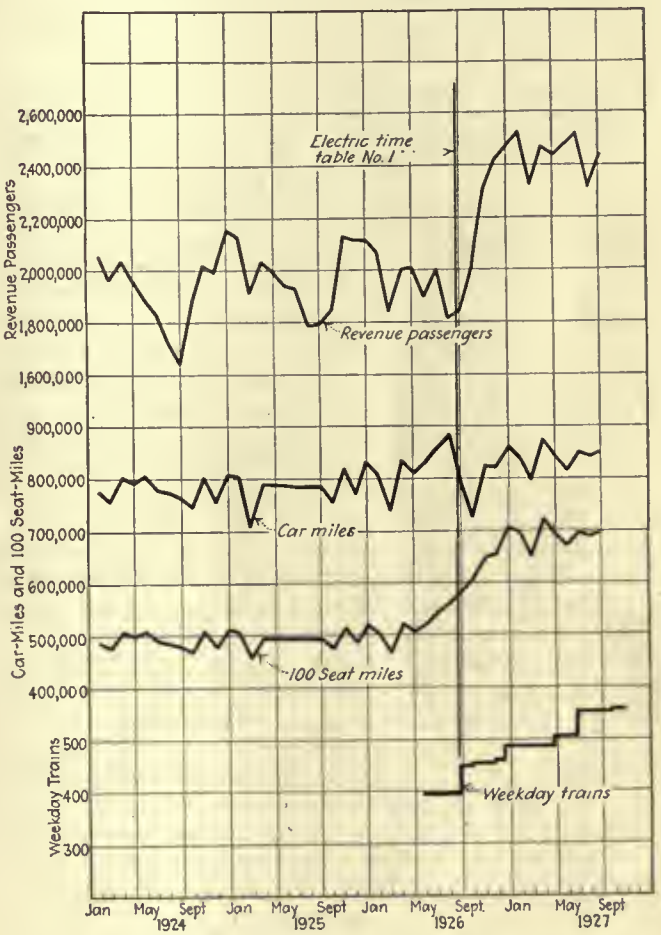


Fig. 1—Operating curves before and after starting electric operation on Illinois Central Railroad

decreases have been made in running times even on runs where more stops are made than formerly.

There has been a large gain in the use of electricity as compared with steam from the standpoint of operating a congested terminal. This improvement will become of greater importance as the service grows, inasmuch as with steam the limit to the number of trains physically possible to move in or out of the Randolph Street terminal was rapidly being approached. It is readily apparent that this gain is made by the elimination of movements necessary for steam engines in changing ends of trains, and also in being brought from and taken to the engine terminal, since these movements must be made over the tracks serving useful train movements. The electric train requires only the normal loaded movements over these busy sections, except when brought from or taken to storage tracks at the beginning or end of rush hours.

*Abstract of a paper presented at the regional meeting of the Great Lakes Section, A.I.E.E., Chicago, Ill., Nov. 28-30, 1927.

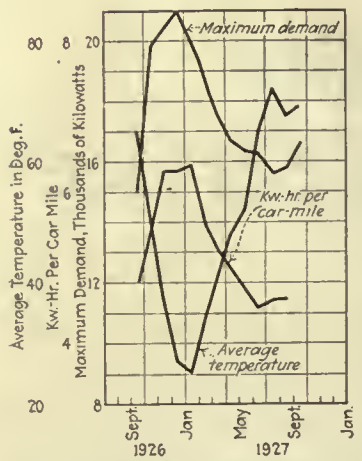


Fig. 2—Curves showing monthly averages of temperature and kilowatt-hours per car-mile and monthly maximum demand

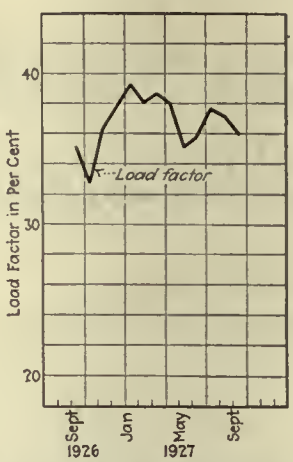


Fig. 3—The load factor curve shows a considerable variation over the twelve-month period

The speed and reliability of electric service have been further enhanced by other improvements of the entire terminal. These include changes in the grades, rearrangement of tracks, elimination of railroad grade crossings, installation of high platforms at all suburban stations, additional interlocking plants and rebuilding the entire automatic block system to conform to electric traction requirements, a great part of which had been completed at the time of beginning electric operation.

Results obtained from the motor-trailer combination have been satisfactory to the operating officers. The elimination of all steps on the cars for regular operation and constructing high platforms, the use of sliding doors, fully inclosed vestibules, tight lock couplers, automatic acceleration and electro-pneumatic braking have made the service safer, speedier and more convenient.



Fig. 4—Typical summer and winter weekday load curves and temperatures. Full lines are for the summer day, the dashed lines for the winter day

The employment of aluminum or aluminum alloys in side and roof sheets, doors, conduit and fittings has materially reduced the weight of the cars and, thereby, the operating expense. The weight of the motor car is 70.65 tons and the trailer 44.27 tons, an average weight per car of 57.46 tons. For the year ended Sept. 1, 1927, the average cost of maintaining the cars was about 6 cents per car-mile. Delays due to electrical equipment have been very few and no radical changes in design have been found necessary. Minor changes incident to new designs have been made, but at very slight expense.

Operating Figures Vary Considerably

Fig. 2 shows the kilowatt-hours per car-mile and the maximum demand in kilowatts, with corresponding average temperatures. Electric heating of cars is, of course, largely responsible for the variation between the different months, but changes in time-table also affect it slightly.

For the year ended Sept. 1, 1927, the total energy supplied under the contract with the Commonwealth Edison Company was 57,274,512 kw.-hr. Of this total, 92.7 per cent was for traction purposes, including heating of cars; 6.1 per cent for light and power and 1.2 per cent for signals. The contract also provided that the railroad company guarantee a 30 per cent load factor. It will be noted in Fig. 3, showing the variation in the load factor, that it is well above the guarantee. Load curves for typical summer and winter weekdays are shown in Fig. 4.

The supply of energy by the power company in specified feeders to the right-of-way line of the railroad company from the seven substations has been looked upon in some quarters with misgiving. This requires that not only the conversion machinery but all protective apparatus in the railroad company's feeders be maintained by the power company. The railroad company, however, has taken over, under normal operation, the control of all traction feeders by use of its supervisory control system. So far the results obtained have been satisfactory with the power company's broad-minded policy in operating under the necessarily somewhat complicated agreement.

Breakers Have Functioned Well

Discrimination of the high-speed circuit breakers has been excellent. The overhead network on a multiple track railroad such as this installation covers is complex due to the necessity of having a minimum amount of track out of service, in case of a fault. Isolation of individual sections in case of trouble has come up to expectations with very good protection to line and equipment. Furthermore, the power supervisor controlling the traction feeders has immediate information as to opening of breakers. He is located in the office of the train dispatcher, so that, by working close together, trouble from a train going from a live to a grounded dead section has been minimized. The use of wayside signals indicating a dead trolley section at points where the sectioning is outside the limits of interlocking plants has also saved burn-outs of overhead.

The cold weather of the first winter indicated that a few minor changes, especially in pull-offs, were desirable. The delays which have occurred, however, have been small considering the size of the installation and the number of trains operated.



The new cars are comfortable and attractive. They replaced antiquated equipment that repelled riders

Revenue Doubled

by Modernization of Porto Rico Railway

New cars have been bought, some old cars have been remodeled and track has been rebuilt. Polarity of electric distribution has been reversed

By Frederick Krug
General Manager Porto Rico Railway, Light & Power Company, San Juan, P. R.

IMMEDIATE increase of 30 per cent in the number of passengers carried and the doubling of its passenger revenue in a period of one year have been the result of improvements introduced on the street railway system of the Porto Rico Railway, Light & Power Company, San Juan, P. R. Four factors have contributed to the attainment of this result: First, the purchase of six new steel cars, modern in every respect and specially designed for tropical service, and the complete rehabilitation of the best five of 35 old cars; second, extensive overhauling and improvements to track and roadbed; third, speedier and more reliable service by the substitution of a loop operation for the former single-track service with turnouts and delays in the residential district, and, fourth, advertising and publicity.

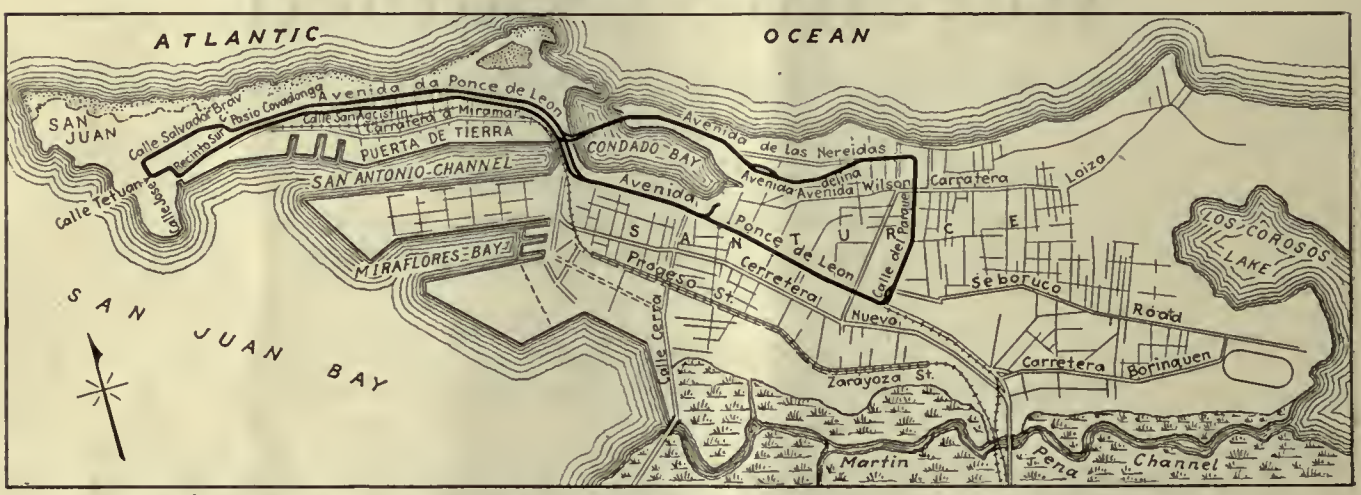
Staggering along some years ago with antiquated equipment, with maintenance deferred on its track and with practically unlimited competition by jitneys and



The city of San Juan is on the island in the foreground. On the mainland behind are two important suburbs

buses, the situation of the trolley system went from bad to worse, until finally, early in 1926, the losses reached such a magnitude that some drastic action was necessary. The company had been trying for more than seven years to secure a franchise to extend its double track from the city of San Juan through the main residential district of Santurce, but without success. It was impossible to give an adequate service in a city of the size of San Juan with a single-track system. Abandonment was considered as a means of bringing the matter to a head, but this proposal was not acceptable to the Public Service Commission except under conditions with which the company was unwilling to comply. The population of San Juan and environs is approaching 100,000 and the city is growing rapidly. It was felt that no city of this size could be adequately served by buses alone and that the street car would sooner or later come into its own again as a vital factor in the transportation situation.

Accordingly plans were made to rehabilitate the system



Double track is used in San Juan. In the suburbs at the right is a single-track loop, on which the direction of traffic is reversed several times a day

in an endeavor to meet operating expenses pending the possible construction of a double-track system later and the growth of the city to the point where the street railway again became indispensable. An order was placed for six new light-weight, steel, four-motor, single-end cars, with a seating capacity of 57 and a total weight of only 30,000 lb. These six cars were placed in service last spring and have been running for eighteen hours a day since their arrival. With their bright and cheerful coloring of yellow and white, contrasted to the barn red on the old cars, the new cars met with instant public favor. The leather-upholstered seats in place of wooden seats on the old cars, their practically noiseless operation and the cheerful interiors all contributed to their immediate success. An innovation for Porto Rico on these cars is the front-entrance and center-exit arrangement. The conductor is stationed at the center doors and fares are collected on the pay-as-you-pass system. This has increased the seating capacity and made feasible observation seats on the rear of the car. These seats have proved to be very popular.

Five of the best of the old cars were completely remodeled and painted to conform to the color scheme on the new cars. Leather-upholstered seats were installed and the trucks and bodies were revamped to secure quiet operation. These cars have been helpful in securing the increase in patronage, but it is felt that it would be inadvisable to overhaul any more of them. It is planned rather to buy new ones as the increase in riding requires.

The work of reconstructing the track and roadbed was started a year ago and has not yet been completed. This has involved considerably more expense than was originally anticipated. Nevertheless the work has been carried out in a thorough manner because the company has confidence in the future of the street railway. Fortunately, a considerable portion of the track is T-rail, open on a private right-of-way and paved only at street crossings. Work on this track was completed rapidly. Defective sections of rail were replaced with new rail and all poor ties replaced with hardwood ties purchased in Santo Domingo and in the local market. Badly cupped rail ends were cut off and joints made smooth by building up low spots with the electric welder. A considerable amount of ballast was also added, which has helped to promote smooth riding.

Track in the old city of San Juan is paved. This section is at considerable distance from the power house and it was found that, due to the poor track bonding with which the system had been operating for many years, the bases of most of the girder rails had been eaten away by electrolytic action. This has necessitated tearing up much pavement for replacement of rails and considerable expense has been entailed thereby.

In order to put a stop to this corrosion of the rail on the most expensive part of the roadbed, in addition to improving the bonding, it was thought advisable to reverse the polarity on the system, thus reversing the current flow at the rails. Furthermore, grounds were installed at four points on the system from the rail to the salt water which completely surrounds the city. A good ground consisting of several large steel boiler shells was installed at the power house. It is believed that the reversal of the polarity (negative on trolley, positive on rail), combined with salt water grounds and improvements in the bonding, will keep down rail corrosion and result in a considerable saving in power and better voltage at the motors with a resultant saving in motor maintenance.

The most difficult problem of all was to find a substitute for the single-track service that had been given in the suburbs of Santurce and the Condado for years. San Juan stands on an island almost 3 miles long. The suburbs of Santurce and the Condado, on the mainland,



Comparison of the new and the old. The change has enabled the revenue to be doubled

are reached by several bridges, but are divided from each other by a bay of some extent. In the city of San Juan the system is double track, but at the bridges one track goes out through Santurce on the main highway and the other through the Condado, the two joining to form a loop about 2 miles further out. This situation is shown on an accompanying map.

The Condado section is thinly populated, mostly by people of large means who use private automobiles almost entirely. Santurce, on the other hand, is densely peopled with potential street car riders who at the time these improvements were inaugurated used the buses almost exclusively. The idea was conceived of giving a loop service in the suburban territory by running the cars in the direction demanded by the majority. This was found to require five reversals daily on the loop. Since practically all of the traffic is into and out of the business district of San Juan a schedule was worked out, after careful study, by which all cars go into San Juan through the Santurce section in the morning until 10:30. At that hour the service is reversed in the loop to bring people out of San Juan directly into the Santurce section. Similar reversals are made at 12:30 p.m., 3 p.m., 7 p.m. and 9:30 p.m. By experience it has been found that these are the hours at which the demand for transportation reverses. The result of this schedule has been that the average speed of cars, including stops, has been increased from 7 m.p.h. with the old two-way service to 10 m.p.h. with the loop service, and this in spite of the growing traffic congestion in the city of San Juan.

Considerable time and energy have been devoted to popularizing street car riding by advertising freely in the local papers. A slogan was adopted that has become well known locally, Rapidez, Seguridad y Cortesía, which translated reads Speed, Safety and Courtesy. The company has endeavored by every means in its power to live up to these precepts. That the trolley offers the safest transportation in San Juan and that its staff is unusually courteous is now well recognized throughout the city, and that, because of the advantage of considerable private right-of-way the street car can generally make better time than other vehicles in the rapidly growing congestion of the city, the street car is daily gaining in patronage.

California Commission's Work

SEVENTEEN appraisals of properties of public utilities were engaged in by the valuation division of the engineering department of the California Railroad Commission during the fiscal year ended June 30, 1927, under seven condemnation, eight rate and two securing issue proceedings. Properties of five different types of utilities, located in various parts of the state, were included in these investigations. Property valued at many millions of dollars, easily in excess of $100,000,000, is included in the valuation work of this division, the figures themselves not being available at this time. Among the railways were the Key System Transit Company, Stockton Electric Railway, Los Angeles Railway, Pacific Electric Railway and the San Jose Railroad.



One of the new cars passing through the city of San Juan

Apprentice Course Works Well in St. Louis

Four-year course, with concurrent training in trade school, attracts young men to railway shops. The majority stay with company after graduation

FOR the past eleven years, except during 1917 and 1918, the United Railways of St. Louis has been conducting an apprenticeship course in its shops, divided into electrical work, machine shop work, car building and car painting. Previous to 1916 the company used each year to engage a number of boys between the ages of sixteen and eighteen years for its shops, but as it had no plan of training them in the various branches of the work they did not remain long in its service. Particulars of the existing plan are given in the company's brief for the 1927 Coffin Prize.

Fortunately for the success of the present course, the St. Louis shops are near the David Ranken School of Mechanical Trades, a trade school with a high reputation in St. Louis. In planning its apprenticeship course, the company decided to offer to send its shop apprentices to this school if they would agree to take the company's apprenticeship term of four years. At this school the boys attend the night courses. Every apprentice must take at least two nights per week at the school, but has the privilege of attending four nights if he desires to do so. The courses taken by them include mathematics, drafting and applied science, and their tuition bills are paid by the United Railways.

The apprenticeship course under these conditions was started in 1916 with a maximum enrollment of 20 boys, divided in the electrical repair shop, machine shop, car building shop and paint shop. The rate of pay at that time was 12 cents per hour for the first six months of continuous service, with an increase of 1½ cents per hour at the beginning of each six-months period. This brought the rate for the eighth or final period to 22½ cents per hour. This rate necessarily has had to be increased under the present changed conditions.

In each department of the shops the boy starts in with the simplest work and gradually acquires experience in all branches of his trade. For instance, in the machine shop an apprentice is put on the drill press for the first six months. During the next 3½ years he is advanced from machine to machine until he has had experience in every kind of shop work in that department. In the other departments apprentices are likewise started with the simpler duties and moved higher as the course continues.

The only time that there has been any interruption to this system of apprentice training was during the war years of 1917 and 1918, when a number of the boys who had had one or two years training left. With the experience they had acquired they found it possible to obtain better paying positions in manufacturing plants in St. Louis. In 1919, after this artificial spurt in manufacturing was over, the company was able to go on with its course in the regular way.

Since the plan was begun in 1916, and up to June 1, 1927, nineteen apprentices had completed the four-year course. Of this number fifteen are still in the service of the company. At present 22 apprentices are taking the course. Of this number, six are in the armature room, four in the machine shop and twelve in the carpenter shop.

The company's experience has been that an apprenticeship course of this kind is entirely practical and beneficial both for the boy and the company in maintaining the necessary quota of skilled mechanics. The schedule followed is given in the accompanying table.

SCHEDULE OF WORK FOR APPRENTICES

Machine Shop:
- First and second periods, drill press and bolt cutter.
- Third and fourth periods, drill press and shaper.
- Fifth and sixth periods, milling machine and lathe.
- Seventh and eighth periods, planer and lathe.

Paint Shop:
- First and second periods, rough work, cleaning, priming and surfacing.
- Third and fourth periods, coating and brush-work.
- Fifth and to eighth periods, brush and pencil work, striping and lettering.

Armature Room:
- First period, sleeving and tieing coils.
- Second period, winding coils.
- Third period, taping coils.
- Fourth period, taping fields.
- Fifth period, winding fields.
- Sixth period, repairing controllers.
- Seventh period, stripping armatures.
- Eighth period, winding armatures.

Carpenter Shop:
- First period, stripping cars.
- Second period, floors and framing.
- Third period, car hanging.
- Fourth period, car framing.
- Fifth period, roof and side panels.
- Sixth period, vestibules.
- Seventh period, fitting sash and doors.
- Eighth period, ceiling and trimmings.

After an apprentice has finished his course of four years work in the company's shop and has received the proper rating from the Ranken Trade School he is given a certificate of graduation by the company. His pay is then increased 22 cents per hour and he is retained in the service of the department in which he has been trained. Here his duties and rate of pay are comparable to the men in that department classed as journeymen.

Street Railway Operation of Buses in Germany

RECENT statistics compiled by the German Street Railway Association show that the 77 members of the association operate 1,064 buses and that four of these operate a total of 39 bus trailers. In the table compiled by the association the operating roads were grouped in four classes, as shown in the accompanying table. In the first group Hamburg leads with 58 buses and Dresden has 55. The third group covers small railroad lines outside of the German State Railway System and the fourth the Berlin General Omnibus Company. This road is classed by itself because it is controlled by the city of Berlin, which also owns the street railway system. Hence it is operated in non-competitive service with the Berlin street railway.

STATISTICS OF BUSES OPERATED BY MEMBERS OF GERMAN STREET RAILWAY ASSOCIATION

No. of Cos.	Type of Company	Number of Vehicles Buses	Trailers	Length of Line Kilometers	Miles
60	Street railways	546	39	2,161	1,351
10	Interurban railways	41	..	655	409
6	Private railway lines	46	..	496	310
1	Berlin Omnibus Company	431	..	307	192

Maintenance Methods *and* Devices

Grease Lubrication for Brake Hangers

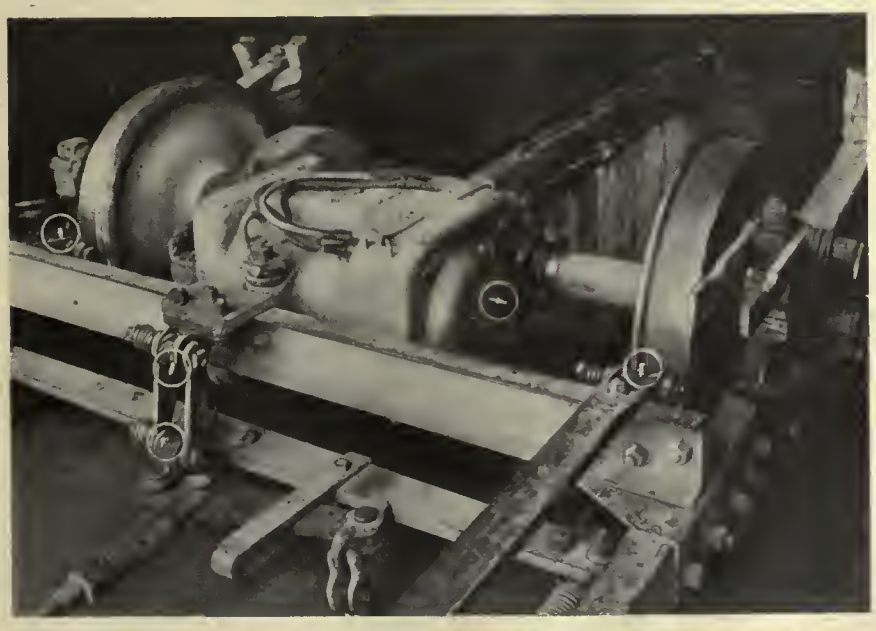
By J. Ed Lawless
Master Mechanic El Paso Electric Company, El Pasa, Tex.

CONSIDERABLE reduction in time and cost for lubricating foundation brake rigging of electric cars has resulted through the use of Alemite fittings installed in various parts of the trucks by the El Paso Electric Company. This company has 40 single-truck Birney cars on which this method of lubrication has been installed. Economies have resulted particularly in the lubrication of half-ball hangers. It is difficult to lubricate the balls and sockets of these hangers as it is necessary to remove them both in order to get the grease in properly. One of the car truck inspectors of the railway conceived the idea of installing Alemite fittings on the shoe heads and hanger holders so that grease for lubrication can be forced into the sockets by using the standard high-pressure grease gun.

This plan has worked out very satisfactorily. As the cars are overhauled, each shoe head and hanger holder casting is drilled and tapped and a fitting is screwed in the end of the casting between the sockets so that grease injected through the fittings will be forced both ways along the bolt into the socket. Twelve fittings are required per truck. The time and labor of installing are small and the cost of the fittings amounts to only a few cents each.

The advantages of lubricating these parts by this method are shown in the reduction of time required. Tests were made to obtain actual figures of time and cost of labor saved. To remove the brake hanger bolts and put grease in the sockets requires 40 minutes' time of a truck inspector and his helper, 80 minutes for one man. This labor costs 47 cents. A helper can lubricate the hangers on a car equipped with Alemite fittings in four minutes at a cost of 2 cents for labor. The saving effected is one hour and sixteen minutes or 45 cents. The work of attaching the grease gun connection and injecting the grease is so simple that every car is assured of having the brake hangers lubricated at every inspection. The parts being amply lubricated will not wear nearly as rapidly and therefore the cost of maintenance is reduced. Also the noise of loose rattling brake hangers is eliminated.

Try a "beauty shop" to keep your control fingers well manicured.



Circles indicate points on truck where Alemite fittings have been installed for lubrication

Convenient Commutator Slotter

IT IS not practicable in Atlanta to have the commutator slotter mounted on the machine where commutators are turned because bearings are fitted while the armature is in the lathe and the time does not permit of the additional work of slotting the commutator. Accordingly the slotter shown in the accompanying illustration was constructed in the shops of the Georgia Power Company. It is described in the brief submitted for the Charles A. Coffin Award. For the slotting operation the armature is mounted on V blocks on the stand. The pinion end V block is raised or lowered to level the armature. The depth to which the slotting saw will cut is regulated by an adjusting screw on the left leg of the stand, which raises or lowers the motor carriage.



Commutator slotter constructed in the shops of the Georgia Power Company, Atlanta, Ga.

The speed of the motor is 1,120 r.p.m. The saw is carried on an extended arbor which is adjustable to take care of various lengths of armatures.

The motor is mounted on a pivot which makes possible the slotting of commutators which are slightly skewed. The upright supporting the pinion end of the armature is adjust-

able to care for various lengths of armatures. This machine provides a clean-cut job, uniform slots and speedy work.

Aligning Carbon Box With Brush-Holder Studs

DUE to rough handling of brush-holders, either before they are installed in railway motors or during the process, the studs supporting the brush-holder framework may become bent, so that the carbon box is thrown out of its normal position in relation



Convenient type of fixture for gaging brush-holder studs and carbon brushways

to the studs. To check brush-holders just previous to installation and make certain that correct position of the carbon box is maintained a special fixture is used in the 65th Street shop of the Third Avenue Railway, New York City.

This fixture has a metal block machined accurately to the same size as the inside of the brush-holder carbon box. For some types of brush-holders the block can be slotted so as to fit around the contact springs and tips that rest on top of the brushes. The upper part of the block has a projection which acts as a stop when inserted in the carbon way and also provides for pivoting an extension arm to gage the position of the upright supporting rods. In the accompanying illustration the fixture is shown inserted in the carbon box of a brush-holder and the extension arm is just engaging the insulator studs. Where these are in correct position the arm with the two slotted sections can be forced down into a position so that the hinged block comes against the stop at the back of the metal piece which fits in the carbon box and the slotted arm is at a right angle to this. The slots in the extension arm are machined accurately so as to form a gage for the studs. The metal block forms a gage for the inside of the carbon box. A handle at the end is used to remove the fixture.

Use of this type of fixture has remedied troubles from brush-holders being out of alignment when installed in motors. Also, correct fit of the brushes in the carbon ways is assured and flashing due to incorrect position of the brush-holders is eliminated.

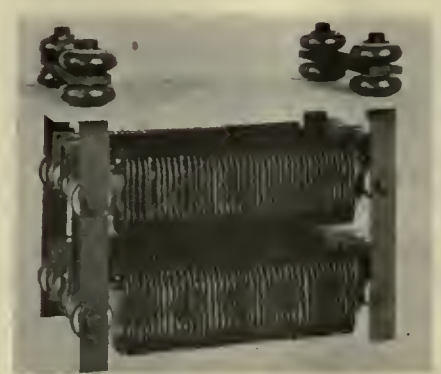
New Equipment Available

Edgewise-Wound Resistor

EDGEWISE-WOUND resistors, non-breakable and non-corrosive, have been placed on the market by the General Electric Company, Schenectady, N. Y. Resistors of this type are designed for use on electric cars, electric locomotives and gas-electric buses, and are particularly suitable where vibration and exposure to the elements tend to shorten the life of the more fragile cast-grid types of resistors.

The new resistor is light in weight. The six-unit type weighs approximately 50 lb. and the four-unit resistor approximately 40 lb. about half the weight of cast-grid resistors of corresponding capacity.

The resistor units are constructed of unbreakable, non-corrodible ribbon rolled from a special alloy. The joints are copper-to-copper and few in number, insuring minimum contact resistance. The ribbon is wound edgewise over heat-resisting and mechanically strong insulation, fitted over the edges of reinforced punched steel bars. The units themselves are



Form C, edgewise wound resistor

supported on steel rods with secondary insulation of mica.

The units are elliptical, conserving space and permitting the use of more active ribbon. The alloy has a practically constant temperature coefficient, resulting in but slight variation in resistance. Its specific resistance is materially higher than that of cast iron.

Terminals welded to the ends of the alloy ribbon insure perfect mechanical and electrical joints. Terminals at the ends of the resistor frame simplify the connection of leads and also facilitate making various series and parallel combinations. Clamp terminals for connecting to intermediate turns of each unit permit accurate adjusting of each resistance step.

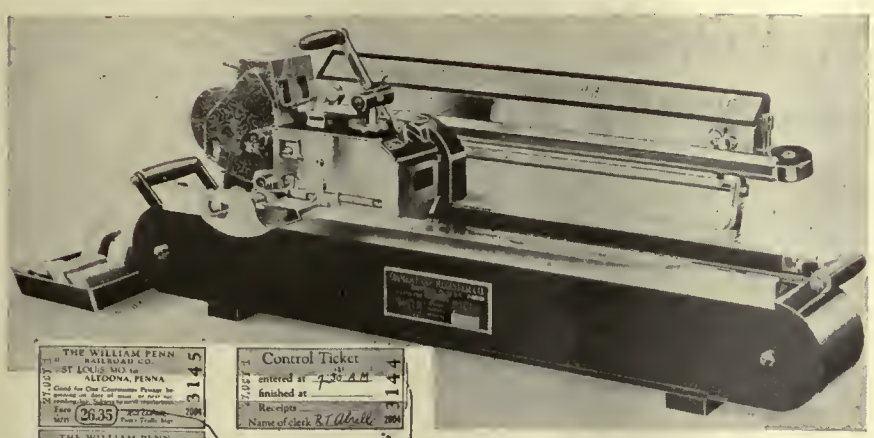
Any single-coil unit can be replaced without disturbing the others. Both the four-unit and six-unit edgewise-wound resistors are interchangeable with certain forms of cast-grid and other types of General Electric resistors, all having identically located supporting bolt holes. In many instances, however, fewer boxes can be used than are necessary with the cast-grid types.

Safety devices make cars safe, modern renewals make them save.

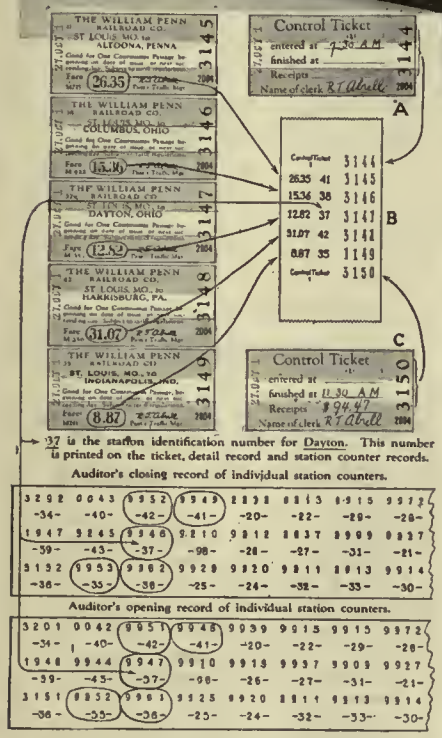
Ticket Printer for Use in Ticket Office

STANDARD size cardboard tickets are issued on demand by a machine announced by the Ohmer Fare Register Company, Dayton, Ohio. The new ticket printer turns a cardboard slip into a railway ticket instantly with the name of the station of departure and destination, the date, the ticket number, the amount paid, the number of miles and such special instructions as may be desired.

Not only are the tickets printed and issued accurately and quickly, but a complete detailed record of all the essential information is printed automatically in duplicate on two control tapes. One of these tapes is accessible to the ticket seller at all times and is used by him for the purpose of checking and balancing his receipts. The other control tape is for



New type of printing machine for tickets to be used in ticket office



Sample set of tickets and records from an Ohmer ticket office ticket printer

A—Ticket seller's opening control ticket.
B—Ticket seller's detail record of all tickets sold. A duplicate of this record is locked in the machine for the traveling auditor.
C—Ticket seller's closing control ticket.

the use of the auditor and is accessible only to him or his authorized representative. It is removed at such times as may be desired for the purpose of checking and is filed as a permanent record of ticket sales.

In addition to the protection offered by the control tape, the machine is provided with segregating totalizers which are accessible to the auditor only, or his representative. From these totalizers may be taken at any time printed totals showing the number of tickets sold by the ticket office to any destination. From another automatic counter the total number of all tickets sold is visible at all times.

The ticket seller upon starting work prints and issues what is called a control ticket, upon which he enters his name and time of starting. At the end of his day's work he issues a similar ticket, upon which he enters the day's receipts and his name. He then becomes responsible for all tickets issued, as shown by the consecutive numbers between those of his starting and closing control ticket. The auditor's duplicate control tape bears a record of these control tickets so that no possible operation of the machine can be lost sight of.

In an accompanying illustration a series of five tickets are shown. The two control tickets were issued by the ticket seller to himself at the beginning and at the close of his working period. The closing control ticket gives the amount of sales as well as the quitting time. The first and last ticket numbers on the control record slip correspond with these two control tickets, and the five other numbers on the control record slip correspond to the numbers of the tickets actually sold. The amount of the sale appears on both the ticket itself and the control record slip, as do the figures representing the destination.

Taking ticket 3147, for example, we find it was sold to Dayton for $12.82. This amount also appears on the control record slip opposite the corresponding consecutive number, together with No. 37, representing the destination point (Dayton). No. 37 also appears on the ticket.

By following the line to the lower part of the illustration it is seen in the reproduced record taken from the segregating totalizer the opening count for tickets sold to date, namely, 9947, and, further up, the closing figure, 9948, showing that one ticket has been sold.

The mileage, as well as the amount of fare, is printed on the ticket. The ticket sold to Dayton for $12.82 shows M351, which indicates 351 miles. No. 2004, which appears on the ticket just below the consecutive number, is the station number from which the tickets are sold, in this case St. Louis. No. 2004 is also printed adjacent to the opening and closing numbers on the segregating totalizer for the total number of tickets of all kinds sold from that office.

Adjustable Head in New Spray Gun

FOR any spray painting system the principal unit is the gun. To provide for changed conditions in finishing and painting work, the De Vilbiss Company has just brought out a new spray gun with several improved features. One of these is the spray head with graduated adjustment to control both character and width of the fan spray. The graduated adjustment makes it possible to return quickly to a previous setting for producing any desired spray. The air can also be cut off to produce a round spray. This adjustable spray head eliminates split sprays and overspray and insures proper balance



New spray gun with improved pieces

between the amount of material used, the nature of the work and the speed of operation.

Another improved feature is the self-centering of nozzle parts, making it impossible for these to get out of alignment.

The new gun, known as type AV, has a construction such that with low air pressure ranging from 40 to 60 lb. and a minimum air consumption, the material is finely, softly and evenly atomized and a smooth, uniform coating can be put on. Perfect atomization and uniformity of coating reduce sanding time and rubbing labor to a minimum.

The fluid tip is made of high manganese chrome alloy steel, double heat treated and ground to gage. The body is made of a special high-strength, heat-treated, alloy aluminum drop forging.

Association Activities

Human Engineering

By Charles M. Schwab
Chairman of the Board Bethlehem Steel Corporation

IF THERE is one outstanding slogan which serves as a common motto for American industry today, that slogan is expressed in the phrase "Safety First." The fact that this has become the outstanding slogan is an expression of the supreme management of American industry, namely, that the conduct of industry involves not merely the efficient direction of machines but primarily the guidance, the protection and the promotion of the welfare of human beings.

Human engineering—that's the real study of the great engineer of today:

Our railroads are realizing amazing results. I was told the other day that the great Pennsylvania Railroad has this fall been handling a volume of freight about equal to that of 1923 with one-third less equipment. Men are being paid better wages, conditions of work are being made better, the public is getting a better service; there is economy, profit and progress all around.

Our railroads, too, engaged in an occupation with many unavoidable hazards, give constant thought to safety—safety for their passengers, but, above all else, safety for the human being, without whom all the tracks, bridges, cars and locomotives in the world would not make possible the operation of a single railroad.

An unusual contribution to the promotion of healthy rivalry among railroads in attaining safety has been made by the American Museum of Safety. For some years before the war and since then—during the last two years—that organization has awarded annually, by virtue of the generous action of Mrs. E. H. Harriman, whose late husband was one of our greatest railroad men, the Harriman memorial medals, to those Class I steam railroads which, in their respective groups, have done the most during the year to secure progress in safety and accident prevention.

The gold medal for the year ended Dec. 31, 1926, has been awarded to the Norfolk & Western Railway. This railway has realized a most remarkable result, showing a reduction of 28 per cent in the number of persons killed for the year 1926, as compared with 1925, and of 15 per cent in the number injured. This result was obtained notwithstanding an increase of over 8 per cent in the number of miles run by its locomotives.

**Abstract of an address at a meeting of the American Museum of Safety at New York City, Dec. 28, on the occasion of the presentation of the E. H. Harriman memorial medals and special certificate to railroads for safety and accident prevention work in the year ended Dec. 31, 1926.*

The members of the award committee were so impressed with the showing made by the Norfolk & Western Railway in 1926 that all members of the committee commented on it as one of the outstanding examples in recent years of the results of applying intelligent safety methods to railway operation.

The silver medal has been awarded to the Duluth, Missabe & Northern Railway. This company again shows a record of no passengers or employees killed during the year. This company realizes the additional distinction of winning the silver medal for the second year in succession.

The bronze medal is awarded to the Quincy, Omaha & Kansas City Railroad. This is a small railroad and one of the less prosperous, but it went through the entire year of 1926 without injuring a single passenger or employee.

I congratulate the management as well as the employees of each of these railroads upon winning these awards. Such results are not achieved by haphazard methods. The awards are made as a token of thought and vigilance during every hour of the day and night, the slightest lapse at any moment meaning danger if not disaster.

These railroads, and all the others who have participated in this competition, have made a new contribution toward the science of human engineering. May safety first and the welfare above all else of the human being continue to be the watchword of all our railroads and all our other industries.

Program Announced for Midwest Meeting

MANY subjects of interest are listed on the program for the midyear meeting of the Midwest Electric Railway Association to be held at Hot Springs, Ark., Jan. 16 and 17. Following is the schedule of events for the two days:

Monday, Jan. 16

9:00 a.m.—Registration.

10:00 a.m.—Address of Welcome, F. Leslie Body, manager Hot Springs Chamber of Commerce.

10:10 a.m.—Response—F. G. Buffe, vice-president.

10:20 a.m.—"The Power of Leadership," by J. B. Wootan, editor *Public Service Magazine.*

11:00 a.m.—Résumé of the legislative situation at Washington, by Leslie Vickers, economist A.E.R.A.

11:30 a.m.—"Building Sales Instinct in Men," by R. C. Forman, Stone & Webster.

12:15 p.m.—Luncheon: (a) Subject, "Transportation Failures"—leader, R. C. Coffy, vice-president and general manager Fort Smith Light & Traction Company.

(b) Subject, "Mechanical Problems"—leader, W. J. Martin, chief engineer Northeast Oklahoma Railroad.

3:00 p.m.—Sightseeing trip for all delegates and guests.

6:30 p.m.—Banquet, Arlington Hotel; music by K. T. H. S. Orchestra and Missouri Pacific Colored Quartet.

"Relationship Between the Press and Public Utilities," by Walter M. Ebel, city editor *Sentinel-Record,* Hot Springs.

"The Industrial Opportunities of the Midwest," by Dr. C. H. Brough, former Governor of Arkansas.

Dancing.

Tuesday, Jan. 17

9:45 a.m.—"The Bus in Urban Transportation," by D. E. Druen, superintendent of bus maintenance Kansas City Public Service Company.

10:15 a.m.—"Developments in Modern Electric Railway Equipment," by Claude L. Van Auken, managing editor *Electric Traction.*

11:00 a.m.—"Municipal Transportation; Civic Responsibility and Performance," by C. M. Ballou, City Street Railway Commissioner, Cleveland.

11:45 a.m.—Business session.

COMING MEETINGS OF *Electric Railway and Allied Associations*

***Jan. 6*—Metropolitan Section, A. E. R. A., Engineering Societies Building, 39 W. 39th Street, New York, N. Y., 8 p.m.**

***Jan. 16-17*—Midwest Electric Railway Association, Hot Springs, Ark.**

***Jan. 18-19*—Kentucky Association of Public Utilities, annual meeting Brown Hotel, Louisville, Ky.**

***Jan. 18-19*—Central Electric Traffic Association, Hotel Gibson, Cincinnati, Ohio.**

***Jan. 25*—Central Electric Railway Master Mechanics' Association, Hotel Gibson, Cincinnati, Ohio.**

***Jan. 25-26*—American Railway Association, Motor Transport Division, organization meeting. Palmer House, Chicago, Ill.**

***Jan. 25-27*—Electric Railway Association of Equipment Men, Southern Properties, Roosevelt Hotel, New Orleans, La.**

***Jan. 26-27*—Central Electric Railway Association, Hotel Gibson, Cincinnati, Ohio.**

***Jan. 31*—New York Electric Railway Association, annual meeting. Hotel Commodore, New York, N. Y.**

***Feb. 13-17*—American Institute of Electrical Engineers, winter convention, New York, N. Y.**

***Feb. 17-18*—Central Electric Railway Accountants' Association, Hotel Gibson, Cincinnati, Ohio.**

***May 2-5*—Southwestern Public Service Association, Dallas, Texas.**

***July 8-12*—Public Utilities Advertising Association and International Advertising Exposition, Detroit, Mich.**

SEPT. 22-28, 1928

American Electric Railway Association, 47th annual convention, Cleveland, Ohio.

News of the Industry

I.C.C. Grants Increase on North Shore Line

Intrastate passenger fares on the Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., were ordered raised from 3 cents to 3.6 cents a mile by the Interstate Commerce Commission on Dec. 22. The increase, which was granted in order to remove unjust discrimination against interstate commerce, is to become effective on or before Feb. 15.

Appeal to the Interstate Commerce Commission was resorted to by the railroad following the refusal of the Illinois and Wisconsin Public Utility Commissions to allow an increase in rates within the two states. Claiming that the intrastate fares of the North Shore Line from Chicago to competitive Illinois points and from Milwaukee to competitive Wisconsin points ranged from 4 to 23 cents less than those of its steam railroad competitors and that on this account interstate passengers were being discriminated against, the railroad took its case before the federal commission. The interstate fares of the North Shore Line were increased last spring from 3 to 3.6 cents per mile, to match the steam railroads' tariffs.

Protection Sought for Car Men in Memphis

Two-men cars and armed guards on outlying runs are to be demanded by the trainmen in Memphis, Tenn., as a protection for car operators against bandits. This is the aftermath of the recent slaying of Robert H. Calvery, motorman on the Chelsea Avenue Line of the Memphis Street Railway. As a protection for its men the company meanwhile is employing special officers and plain clothes men to ride on cars making outlying runs. It has also offered a $500 reward for the apprehension of the slayer of Mr. Calvery. The union is offering a like reward.

Recommendations by New York State Mayors

The New York State Conference of Mayors, sometimes called the "third house" of the Legislature, will supplement the Governor's message by sending to that body its recommendations when the Legislature meets in January. Regarding utility legislation, the conference said it would urge the enactment of legislation of a permissive character which would give to the municipalities the right to acquire, construct, own, lease and operate within or without their corporate limits any public utility, product or service of which it was or was to be supplied to the municipality or its inhabitants, or to enter into contract for such service.

It would further urge the Legislature to enact a law which will give cities authority to own and operate buses.

Ceremonies Attend Power Station Opening at Norfolk

The new several million dollar addition to the Reeves Avenue power station of the Virginia Electric & Power Company at Norfolk, Va., was formally opened on Dec. 7. Special ceremonies were arranged for the opening which makes the plant one of the largest in the South and virtually doubles its capacity.

One-Man Cars to Be Run Over Steam Tracks in Sharon

Permission to operate one-man cars over steam railroad tracks in the city of Sharon, Pa., has been granted to the Shenango Valley Traction Company by the Pennsylvania Public Service Commission. Before the company can install the one-man operation the commission directs that it must adopt certain safety conditions.

The Shenango Valley Traction Company operates a line 17.73 miles. Its one-man cars will now run over the tracks of the Erie Railroad in Sharon, Pa. Train movements over the crossing are largely industrial and average about eight a day.

Atlanta Company Praised

State commission says that railway patrons in Southern city have enjoyed a fare for the past nine years that experience has shown to be too low

IN ITS opinion in the Atlanta fare case fixing the new fares on the city lines of the Georgia Power Company at 10 cents cash with four tickets for 30 cents or twenty for $1.50 the commission said that experience has demonstrated beyond question that the commission in the 1918 and 1920 cases fixed a fare too low. The state body says that if it had provided a reasonable fare in 1918 and 1920, the recent application would have had no excuse for existence at this time. The same authority says it may appear to some as unfortunate that this was not done, but be that as it may, patrons of the railway have enjoyed a fare for the past nine years that experience has shown to be too low.

Considering the scant earnings of the company for a long number of years, the commission did not feel justified in doing less than had been concluded to be reasonable, but at the end of twelve months from the effective date of the order just entered the commission will consider the earnings of the company under the new scale of rates, and if conditions at that time justify it, the commission will take proper steps to make due corrections.

In the commission's opinion the Georgia Power Company is now rendering the best railway service in its history, and certainly far in excess of any period experienced by any of its predecessors, due in no small degree to the splendid personnel in the operating department, "the motormen, conductors and other employees in the railway department being composed of as high a type of men as will be found anywhere in the United States." The commission says:

As shown by the record in this case the company operates under conditions which prevail in comparatively few cities throughout the country. The physical values of the railroad property include approximately $4,000,000 for paving the streets traversed by the various lines of applicant, which is required under franchises. It is also shown from the record that the company is required to pay to the city of Atlanta a gross receipt tax of 3 per cent of all revenues taken in. As a result of this street paving cost, there is charged to operating expenses approximately $100,000 for depreciation, and there is included in the return resulting from the rates approved herein $280,000, or a total of $380,000, which must be paid by the car riders on account of this street paving cost. As a result of the 3 per cent gross receipt tax, there is to be charged to expenses approximately $180,000. In other words, there is to be added to operating expenses, which results in a deduction from the net income, $560,000 per annum, due to the paving charges and gross receipt tax. These charges to operating expenses are conditions over which the commission has no control, but at the same time it is obviously necessary that these items of operating cost be considered in determining such a rate of fare as is necessary under conditions enumerated herein.

In the early part of 1924 the company petitioned the Mayor and Council of Atlanta for relief, and, among other things, asked the City Council to approve fares covered by the company's petition in the recent case. The record shows that the City Council advised the company it had no jurisdiction over the car fares, and without expressing an opinion for or against the petition, suggested that it was a matter to be considered by this commission. During the proceedings before the City Council it was agreed between the company and

Council that a valuation and audit should be made of the company's street railway property and its records, the cost of same to be paid by the company, whereupon the city employed nationally known engineers and auditors to do this work.

It was contended by the company that it was not earning a reasonable return on the fair value of its property devoted to the public use. Evidence submitted at the hearing showed a decrease in net earnings for the years 1921 to 1926, inclusive, except the years 1924 and 1925. The commission said:

In order to determine whether or not the company is earning a reasonable return, it is first necessary to determine what is the fair value of the railway property devoted to the public use on which the company is entitled to earn a reasonable return. In this case, the company submitted various values. What is known as the historical, or cost value, is based upon the value found by Engineer Baehr, in his appraisal as of March 18, 1912, which was made with the intention of leasing the properties of the Georgia Railway & Electric Company to the Georgia Railway & Power Company. The physical property, as found by Engineer Baehr at that time, excluding jointly used property, but including overhead charges, was $8,766,673. Additions and betterments to the property, not including jointly used property, from 1912 to Dec. 31, 1926, amounted to $7,378,162, making a total historical cost value of the physical properties, excluding jointly used property, but including overhead charges, as of Dec. 31, 1926, $16,144,836. Based on this historical cost, and adjusted to prices current as of Jan. 1, 1927, loss accrued depreciation, gives a value of $21,989,421.

The record shows that Engineer Baehr made another appraisal of the property, as of July 1, 1921, and the physical value found by him on that date, reproduction cost new, less depreciation, was $17,813,099. Additions and betterments to the property from July 1, 1921, to Dec. 31, 1926, amounted to $4,805,865, or a total value, less accrued depreciation, of $22,618,964. The value found by Engineer Beeler, in his appraisal for the city of Atlanta, excluding jointly used property, with additions and betterments to Dec. 31, 1926, is $19,614,216.

Engineer Luick submitted an appraisal as of Jan. 1, 1927. Mr. Luick's physical value as of that date, less depreciation, and excluding jointly used property, was $20,402,860. The physical value found by Mr. Luick, less depreciation, including jointly used property, as of Jan. 1, 1927, was $22,885,039.

It will be seen that all values above referred to do not include any amount for working capital or going concern value, which should be given consideration for rate-making purposes. Engineer Luick took the position that $450,000 should be allowed for working capital and $2,500,000 as going concern value, in the present case.

The commission did not in 1918 or 1920 nor has it in this case considered capitalization as a basis for the rates. The fair value of the property used and useful is the only basis the commission has at any time considered for the company, or any other company over which it has jurisdiction, in arriving at a fair value to determine a fair return.

The commission said:

Having in mind the consideration given by this commission of applicant's street railroad property, it is not surprising that in December, 1924, John A. Beeler, consulting engineer of the Beeler Organization of New York City, found occasion in his report to the city of Atlanta, dealing with street railway property of applicant, to express himself as follows: "With these rates of fare under the present operating conditions, eleven of the 22 railway lines are not taking in sufficient to pay the operating expenses. If this condition is not speedily righted, it is evident that the railway will not continue to function properly, and will be unable to finance itself. Properly to care for the growth and development of the community the additions and improvements outlined in this report must be made. This involved large expenditures, as is shown further along. To obtain the necessary funds, the financial condition of the railway must be radically changed. To accomplish this, either the revenues must be increased or the expenses decreased, or both. As shown elsewhere in this report, the net earnings this year (1924) are estimated to be $566,358, or sufficient to pay a return of 8 per cent on only $7,090,000. The discrepancy between these earnings and those necessary to place the railway on a sound footing is so great that the seriousness of the present situation is obvious. There is no time to permit of any unnecessary delay in adopting effective corrective measures, drastic though they may be. If the chief transportation agency of the community is to be paralyzed, it is not to be imagined for an instant that the results will stop there. The whole social, commercial and industrial fabric is dependent upon the proper functioning of the local transportation system, for it is to the community what the circulatory system is to the human body. Interfere with it and disaster is invited; kill it, and the community dies with it."

It will be recalled that the Beeler Organization was engaged by the city to study the transportation system in Atlanta.

The commission says that experience has demonstrated that it was too conservative in its judgment of what the future would reveal, with the result that the railway business would have long since been paralyzed had it not been for the sustaining credit and support of the company's light and power and gas properties. The company said:

Appearances Are Deceiving

There appears to be a common belief in the community served by the railway department that the highly maintained property in the way of roadway and equipment, is all sufficient evidence that the railway department has been prosperous, else this highly maintained condition would not exist. Nothing could be more erroneous. It is also apparent that there is a general belief that the large number of new cars purchased by this company during the last three to four years comes out of earnings, which is another error and without any foundation for its support.

On the question of valuation the commission said:

The Supreme Court of the United States, to our mind, has not been as definite in prescribing rules as a guide for arriving at a fair value as a proper rate base, as we believe should have been done. However, considering their expressions on this subject as a whole, it is very clear that they loan more to the reproduction cost new theory than to any other method. It is our belief that a strict adherence to the reproduction cost new theory would not be best for the company or the citizens it serves. Conditions could happen, as they have happened in the past, which, to apply such a method, would work disaster for the company as well as a hardship on the public, in so far as such would result in the loss of service. Such a theory, if applied in the last half of 1914, 1915 and 1916, would have bankrupted most of the companies throughout the country. However, taking the rates as approved in this case, applied to 1926 business, will not yield more than a reasonable return on a valuation far below the application of the reproduction cost new theory, plus going concern and working capital.

It was the opinion of the commission that the value of the railway property under consideration in this case, as of Dec. 31, 1926, was not less than $20,000,000 for rate-making purposes.

	1914		1920		1926	
	Wages per Hour		Wages per Hour		Wages per Hour	
	Cents	Per Cent	Cents	Per Cent	Cents	Per Cent
Motormen and conductors	25	100	46	183	59	238
					54	215
Cost of living	...	100	...	210	...	168

One of the largest items of expense in the railway department is that of transportation cost, represented largely in the wages of motormen and conductors. The accompanying table shows the wages paid motormen and conductors during the years 1914, 1920 and 1926, as compared with the average cost of living in Atlanta during these years, using the wage scale and the living cost, as prevailed in 1914, as 100 per cent.

The record shows that the wage increase just indicated was made by arbitration. The wages shown in the record for 1926 are 54 cents per hour for two-man cars and 59 cents per hour for one-man cars. The commission, of course, has no control over this question.

The following is a statement of revenues and expenses for the year 1926:

Operating expenses	$3,720,165
Taxes	413,156
Depreciation	394,192
	$4,527,514
Revenue	$5,278,794
	4,527,514
Net	$751,280

Based on a value of $20,000,000 the net revenue just noted represents a return of approximately 3.8 per cent on the railway property of the applicant. The commission says this cannot be justified as a reasonable return, and shows conclusively that an increase in revenue is demanded.

The fare in Atlanta has been 7 cents cash, three tickets for 20 cents or fifteen for $1. There have been no children's rates. Under the new schedule school children are to pay a fare of 5 cents, but only when tickets are bought by them in lots of twenty for $1 at the company's office on presentation of a certificate signed by the principal or teacher. These tickets are to be good on schooldays between the hours of 7 a.m. and 4 p.m.

Liberal Franchise Granted to Key System for Richmond

A new street railway franchise has just been granted by the City Council of Richmond, Cal., to the Key System Transit Company which will become operative on Jan. 6 and continue in force for 50 years. It is one of the most liberal franchises ever granted to a railway, for in it the principle is recognized that the railroad should not pay for paving and that so long as the company lives up to the terms of the franchise the city has no right to grant competing lines other franchises. With this grant Richmond becomes the only city in California with a population of less than 25,000 persons which has a local street car system.

According to the provisions, referred to in the ELECTRIC RAILWAY JOURNAL for Dec. 24, page 1167, the city agrees to bear all the expense of repaving when such is made necessary by plans for regrading, improving the surface or changing the quality or quantity of the paving originally installed. The company agrees to make necessary repairs between its tracks and for a distance of 2 ft. on each side of them. It is further provided that the company shall not be required to relocate, move or rearrange any of its tracks, poles or wires for a period of three years from the time the franchise goes into effect. J. Paul St. Sure, an Oakland attorney, drew up the franchise. Negotiations of the company with the city were conducted by Paul Goldsmith, vice-president in charge of public relations.

Sunday Passes Sell Satisfactorily in San Francisco

One of the latest steps taken by the Market Street Railway, San Francisco, Cal., is the installation of a pass good all day on Sundays and certain holidays. As the company expresses the matter in the *Inside Track*, "judging by the ever-increasing number sold each week, 'it' is being very kindly received by our patrons."

Competition in selling these passes between conductors at the different divisions is getting so keen that the company is thinking about printing the names of the ten super-salesmen who sell the highest number of passes each month.

One conductor, who has been very successful so far, explained that he offers a pass to each boarding passenger, and says: "Ride all day! Only 20 cents!"

Existing Rates in Watertown Continued

The Public Service Commission authorized on Dec. 23 the Black River Traction Company and the Watertown Transportation Corporation, its subsidiary, operating in Watertown, N. Y., to continue its existing fare rates, 10 cents cash fare, seven tickets for 50 cents, until otherwise ordered by the commission. It was held that in view of continued operating losses sustained by the two companies and the action of the Watertown City Council in consenting to indefinite charge of the present fares the petition by the two companies should be granted.

Evidence submitted to Commissioner Brewster showed that the net deficit of the company in 1926 was $4,333 and for the first ten months in 1927 $4,511. The company in the past two years, by reducing its operating expenses, has decreased the deficit, but according to the memorandum by Commissioner Brewster there was no prospect of net earnings. Testimony also showed that the total revenue of the bus company for 1926 was $92,425, while its expenses of operation were $95,263, showing an operating loss of $2,837, and for the first ten months in 1927 there was an operating deficit of $4,467.

Problems of Greater Boston Transit Reviewed

The establishment of electric service over the Saugus branch of the Boston & Maine Railroad terminating at the rapid transit station in Everett, Mass., is discussed in the report regarding service in Greater Boston issued by the Division of Metropolitan Planning. This would be much more feasible financially, the report states, than the plan of running through rapid transit trains. Freight service must be maintained even though steam passenger service on the Saugus branch is abandoned.

Service by trolley is now furnished from Saugus to Lynn by the Eastern Massachusetts Street Railway, but to establish through service coincident with the use of the tracks for freight service the Metropolitan Planning report states that such service should be jointly operated by the Eastern Massachusetts and the Boston Elevated, the Elevated receiving all fares west and the Eastern all fares to the east.

Regarding through service from Boston to Chelsea and Revere the report mentions that there is already through service from Revere Beach to Maverick Square, the cars of the Eastern Massachusetts Street Railway operating over the tracks of the Elevated to that station and that both railways express a desire to accommodate the public. The injustices to the citizens of Chelsea and Revere on their not enjoying the privilege of a single street railway fare from their respective cities to downtown Boston and other parts of the metropolitan district was condoned. The Metropolitan Planning Board takes the position that in all probability acquisition of the Chelsea Division by the Elevated must be accompanied by some contribution from the two cities benefited. But the report expressed doubt whether the Eastern or the Elevated would act in this important matter until the Legislature had finally determined the future status of these two properties and decided whether public control over their operation was to continue.

Viaduct Contract Approved at Atlanta

Mayor Ragsdale of Atlanta, Ga., and President Preston S. Arkwright of the Georgia Power Company have approved a contract with the Georgia Power Company, Atlanta, Ga., whereby $400,000 will be contributed by that corporation toward the construction of the twin viaducts at South Pryor Street and Central Avenue. Actual signing of the contract makes the money available immediately. The contract, according to Mayor Ragsdale, assures ample funds for the completion of the two spans, the city's $1,000,000 having already been augmented by $500,000 from the county and $400,000 from interested railroads.

The contract provides that the present "jitney" ordinance remain in effect, but that in the event of its repeal the city shall pay the company $50,000. The agreement further stipulates that the $400,000 shall be charged against capital expenditure and used in rate making by the company; that interest on the $400,000 shall be paid the power company by the bank in which the money is deposited, until it is used for construction; that the power company shall have the right to lay tracks on both viaducts, and that it shall be assessed no part of the paving charges nor shall it be charged for maintenance save for its poles, wires, etc.

Special Service on Xmas Day in Memphis

Co-operating with the churches and as a convenience to its patrons the Memphis Street Railway, Memphis, Tenn., operated an early schedule of cars on Dec. 25. This provided for a run arriving uptown at 5 a.m.

Federal Tax to Be Deducted from City Payment in Chicago

Under a decision handed down by the Illinois Supreme Court on Dec. 20 the Chicago Surface Lines is authorized in computing the amount due the city of Chicago under the 1907 ordinances to deduct federal income taxes paid to the government. As a part of operating expenses the city sued the Surface Lines for $2,338,596 on the ground that the companies had no right to deduct federal income and excise taxes before computing the 55 per cent of net receipts due the city and insisting also that the city was entitled to interest on amounts tendered by the companies but refused by the city during the years 1920 to 1923, inclusive. The issue on deduction of federal taxes extended over a period of nearly seventeen years. The Chicago Surface Lines opposed both claims and its contention was upheld by a decision of the Appellate Court.

The city filed a petition for a writ of certiorari for appeal to the Supreme Court and in denying this plea the court sustains the Appellate Court decision.

Repeal of Half-Fare Rates for Massachusetts Pupils Opposed

Opposition to the repeal of half-fare rates for school-pupils in Massachusetts was voiced by the Commissioners of the State Department of Public Utilities in a special request to the Legislature filed on Dec. 20. This body unanimously recommends against the repeal of the general law under which street and electric railways are compelled to transport pupils of public day or evening schools, vocational or private schools at not more than one-half the regular fare, "because of the doubt of any material benefits to many of the street railway companies and because of the obvious benefit of this statute to many people of small means, with families large and small, under the burden of obtaining an education for their children."

At the same time, the commissioners found that the statute was abused and while making no change in the fare rate, recommended that they be authorized to adopt such rules and regulations as might be deemed advisable to control the use of pupils' tickets.

In its report the commission said that the basis of the argument was the financial condition of the New Bedford & Onset Street Railway, serving the towns of Marion, Wareham and Mattapoisett and the desire of those towns to assist the railway in every possible way in order that it might continue operations. These towns paid for the transportation of their pupils and at least two of them, by votes in town meetings, indicated a readiness to pay full fare. This they could not do under the law.

The report is based on a resolution of the Legislature, directing an investigation of the subject, which was passed at the last session.

Co-ordination of Traffic Chief Problem in Chicago

A unification of the maze of conflicting traffic regulations in Chicago, Ill., resulting from divided authority among the police department, the various park boards and the country towns is to be attempted by three groups of experts authorized by the Greater Chicago Traffic Committee, which has been organized with Richard W. Wolfe, Commissioner of Public Works, as chairman and James Simpson, head of the city plan commission, as vice-chairman. Three sub-committees of five members each will take up the work of unification and co-ordination.

One of these sub-committees is made up of attorneys and is to work out a system of unified traffic laws. Another, comprising representatives of the police departments, is to evolve a system for the enforcement of regulations decided upon, and the third will consist of engineers who are to work out signal control and other technical problems.

The traffic committee was created a year ago in an effort to determine upon a code for the regulation of the movement of vehicles in the city and co-ordinate the rules of the 26 different governing bodies. Among the members of the committee are the Mayor, Commissioner of Public Works, City Comptroller, Chief of Police, three Aldermen, representatives of the Park Board and the chairman of the Council traffic committee.

Mayor and Comptroller of New York Bury the Hatchet

Mayor Walker and Comptroller Berry of New York have reached an agreement on the subway financing program of John H. Delaney, Transit Commissioner, whereby the Comptroller will raise no further objections and will certify in the 1929 budget to the necessity of amortization of $50,000,000 short-term subway construction bonds to be issued early next year. The Comptroller will not certify to the necessity of $13,000,000 amortization item in 1928 budget as was desired by the Mayor. The Comptroller believes the Delaney subway financing plan illegal and Leonard M. Wallstein, counsel for the Citizens' Union, will seek to get an injunction against the issue of $50,000,000 bonds as soon as they are advertised for sale.

Bus and Rail Employees in Akron Have Equal Educational Chances

Following successful results obtained from its school for bus operators, the Northern Ohio Power & Light Company, Akron, Ohio, has established a permanent training course for its electric railway operators. A course of study covering a period of six months, similar to that in use in the school for bus men, has been adopted. Schools have been established in Akron, Canton and Massillon. Dwight Foust, a former dispatcher and graduate of Wittenberg College, has been chosen instructor. The school has in no way changed the initial training received previously by new employees. This training continues.

Old employees in train service are required to attend one session of the school each week in each of the three cities. Training is by lecture and the schoolrooms are equipped with all the mechanical and electric devices in use on cars. Particular attention is paid to motors, safety devices, door operation, courtesy and safety. Plans call for completion of the course in six months with reviews every six weeks.

Not all of the trainmen are going through the school at one time, but the schools are to continue until every employee in the service either passes or fails the examination. Failures are not to be retained. When all have gone through school, future courses will be confined to new employees. It is not the intention of the company to have employees go through school and then drop the work. The trainmen will be required to attend school sessions at intervals following their graduation.

It will be recalled that the work of the Akron bus school was demonstrated at the convention in Cleveland.

New Franchise for Canton

A new form of franchise to be submitted by the Northern Ohio Power & Light Company in January to the newly organized City Council of Canton, Ohio, will call for a traffic commissioner, a service-at-cost-plus plan of fare and exclusive control of the transportation facilities of the city. It was expected that the franchise would be presented to the old Council because of its understanding of the transportation situation and study of the Beeler organization survey, but more time was involved in the preparation of the franchise, according to an official, than at first was thought necessary and it could not be placed in form for submission to the old Council.

The plan of operating under a city railway commission would follow that of Cleveland, where the Tayler grant is observed.

Subway Freight Contract Before Rochester Council

The subway freight contract that will be submitted by the city of Rochester, N. Y., to the New York State Railways and the five railroads entering Rochester was introduced in the Common Council on Dec. 13 by Alderman W. J. Ward, chairman of the Railroad Committee, and Alderman Patrick Cauley, chairman of the law committee. It was referred to the two committees for a public hearing.

The contract was drafted by Corporation Counsel Clarence M. Platt, who discussed its provisions with Mayor O'Neil and Frederick T. Pierson, president of the Common Council. These follow principally the provisions of the contract between the city and the New York State Railways whereby the subway is operated under the direction of Charles R. Barnes, commissioner of railways, as an extension of the service-at-cost contract.

It included provision for freight operation and incorporates the recommendations made by the Mayor's subway committee, of which John P. Morse is chairman. The New York State Railways agrees to handle expeditiously all freight cars between the railway's connection with the subway railroad and points on the subway, performing equal service without discrimination for all carriers having similar agreements for trackage rights over the subway and for all shippers and consignees.

Safety Campaign in St. Joseph

A safety movement has been started by the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., with the organization of a safety committee. Fred E. Henderson, superintendent of the railway, was made chairman of the committee. A definite program has not been outlined. The object of the committee is to promulgate principles on safety among railway employees and public. Meetings will be held regularly.

Subway Construction Plan Suggested by Mayor Thompson

Announcement of a new plan for subway construction in Chicago was made Dec. 29 by Mayor William Hale Thompson. He proposes widening and double decking the streets by building a level below the present street level. On either side of an open sunken roadway would be two rapid transit tracks for electric railways and above these tracks, on the original street level, would be roadways for trucks and slow-moving vehicles. The sunken roadway in the center would be given over to high-speed automobile traffic. The Mayor states that his plans are tentative only, subject to public approval.

Corporation Counsel Ettelson ruled recently that under the law assessments for subways can be spread over a period of twenty years instead of five years. It is thought this may obviate the need of special legislation for subway construction.

$800,000 Expenditure Suggested for Toronto Rehabilitation

Double-tracking the Mimico radial line as far as the Etobicoke and making it an extension of the city system of Toronto, Canada, at a cost of $800,000, is the outstanding plan in a report submitted recently to the Board of Control by the Toronto Transportation Commission. The cancellation of licenses of bus services running in competition with the lines is a condition of the plan. The board deferred action pending consideration of the matter by city officials.

The report concerns mainly an agreement entered into by the commission, the municipalities of Mimico, New Toronto and Etobicoke and the Minister of Highways, whereby the tracks on the Mimico line would be laid double in the center of the new paved highway and the line made an extension of the city service. Separate fares would be charged outside the city. Cancellation of the licenses for buses, which are said to have seriously impaired the earnings of the railway and provision of a through service with city cars making possible many economies by using joint facilities, were emphasized in the report. The report says:

> The money for capital construction would be provided by the investment of the T.T.C. reserves, and the city would not be required to issue further debentures for this radial. While we do not estimate that a surplus will be possible on this line, neither do we anticipate that, once established, the reconstructed line will be a burden to the city system.

The report refers to the transfer of the line to the Toronto Transportation Commission last January, when the annual deficits were approximately $110,000. The estimated increase in revenue through improvement in the service and elimination of bus competition is $98,000. A loss to the city system of $150,000 annually by buses bringing passengers to the center of the city would also be eliminated, it is thought.

The agreement with the municipalities provides that the T.T.C. shall double-track its line and remove it to the center of the highway; maintain connections with the city line; charge fares not greater than are sufficient to maintain the railway; and that the municipalities, so far as lies in their power, shall prevent the operation of competing transportation.

New Regalia for Cincinnati Men

All motormen, conductors, coach operators and supervisors of the Cincinnati Street Railway, Cincinnati, Ohio, have just been fitted out with new standard badges, while the supervisors have also been equipped with new overcoats which complete their new outfits.



Dignified insignia on Cincinnati caps

The new badge is the same standard design for all groups, but it has the official appearance of a policeman's badge. The company's trade mark is reproduced in the upper section in its regular colors and the identification marks, i.e., position or number, appear in the base.

The motormen's and conductor's badges are worn on the front of the caps only. They are nickel-silver finish. They carry the number of the man on the identification plate. Those worn by the coach operators are bronze, and in addition to numbers they carry the words "Coach Operator" on the identification plate. These are also worn on caps only. Both the street car and motor coach supervisors' badges are gold plate. In the case of the srteet car supervisors the word "Supervisor" appears alone, while the words "Coach Supervisor" are used to identify the other group. These supervisor badges are worn on the chests as well as on the caps. The Whitehead & Hoag Company, Newark, N. J., made the badges.

Formerly the men wore two number plates, one on each side of their caps, and a long name plate on the center of their caps. The nameplate carried the word "Conductor," "Motorman" or "Inspector" along with the operating company's name.

In addition to changing the entire character of the badge the numbering system has been revised. Conductors and motormen have hyphenated numbers, that is, 9-150. The first numeral designates the division and the second the man's number in that division. Even numbers are used for motormen and the odd for conductors. The numbers of coach operators are not hyphenated. They run from 100 up.

The new overcoats which the supervisors just donned were the last thing needed to complete their outfits. They now look like a staff of French generals on parade. These new coats are made of 24-oz. poilu gray serge overcoating. They were tailored by the Fechheimer Brothers Company, Cincinnati, Ohio.



Appearance counts more than ever in Cincinnati

Santa Barbara Case Reported

California commissioner sees need for increased patronage through modernizing and merchandising methods. Results of new fare plans discussed

RESULTS of the study of possible means of increasing the net income of the Santa Barbara & Suburban Railway, at the same time maintaining good service and reasonable rates, were submitted at a hearing before Railroad Commissioner William J. Carr on the application of that company for an increase of rates, held at Santa Barbara on Dec. 9.

The report was submitted by J. G. Hunter, transportation engineer of the Railroad Commission, who has conducted a thorough investigation of the operating and financial conditions of that utility, assisted by Ward Hall and W. H. Gorman, engineers of the transportation division of the Railroad Commission.

Mr. Hunter reported that in his opinion the solution of the problem of obtaining revenues sufficient to meet the operating needs of the company and still allow a fair return upon the property will not be met entirely by an increase in fares. His conclusion is that the most important need of the company is not so much increased rates, but an increase of patronage. A city of the size of Santa Barbara presents real difficulty in determining the best course for a transportation company to follow in order to increase its patronage, thereby increasing the net income. For this reason the commission's engineer urged that the company should lend every effort to obtain more passengers. Engineer Hunter reviewed in his report a number of ways whereby this might be accomplished. Among these plans are low bargain rate fares during the hours 9 a.m. to 4 p.m., aggressive merchandising methods by the company to build up its revenue, improved service, upholstering its cars with leather seats, faster service, neater cars and less noisy operation.

The report deals with a number of plans emphasizing the need for getting away from odd coin fares, and the use of the weekly pass. The following fare plans are discussed in the report:

1. 8-cent straight cash fare.
2. 10-cent straight cash fare.
3. 10-cent cash fare—$1 weekly pass.
4. 10-cent cash fare—$1.25 weekly pass.
5. 10-cent cash fare—three tokens for 25 cents, $1 weekly pass.
6. 10-cent cash fare—three tokens for 25 cents, $1.25 weekly pass.
7. 10-cent cash fare—three tokens for 25 cents, $1.50 weekly pass.
8. 10-cent cash fare—5-cent midday fare, $1 weekly pass.
9. 10-cent cash fare—5-cent midday fare, $1.25 weekly pass.
10. 10-cent cash fare—25-cent weekly pass, entitling rider to 5-cent fare.
11. 10-cent cash fare—five tokens for 35 cents, twenty tokens for $1.

The estimated results of operation under the present fares during the year 1927 were computed by the commission's engineers as follows: Operating revenue, $123,450; operating expense, $121,000; depreciation (6 per cent sinking fund annuity basis) $11,194; total expense $132,194; net operating revenue (loss) $8,744; taxes $7,988; net operating income (loss) $16,732.

Results of the fare plans discussed are estimated by the commission's engineers as follows: (1) $19,737 increase; (2) $26,112 increase; (3) $15,463 increase; (4) $20,322 increase; (5) $10,355 increase; (6) $15,956 increase; (7) $20,334 increase; (8) $1,998 decrease; (9) $3,027 increase; (10) $6,383 increase; (11) $23,023 increase.

Rapid Transit in St. Louis Under Discussion

Mayor Victor J. Miller has made known that A. L. Shapleigh, president of the St. Louis Public Service Company, St. Louis, Mo., has asked for a conference to be held shortly after New Year's on the so-called "service-at-cost" ordinance. The company hopes to obtain a 30-year grant on that basis.

Many opinions are being expressed on rapid transit plans for St. Louis. When reporters queried Mayor Miller on rapid transit, he replied that "plans for rapid transit are included in the service-at-cost ordinance for the St. Louis Public Service Company." C. E. Smith, retiring city consulting engineer, said at a recent dinner in his honor that rapid transit was one of the things the city needs most.

Franchise Extension in Chicago

A 30-day extension of the Chicago surface lines franchises was granted by the Chicago City Council on Dec. 28. Under the terms of the last extension the franchises would have expired on Dec. 31. Mayor William Hale Thompson and Governor Small were to confer on Dec. 30 on the inclusion of subway and railway legislation in the special session call to be issued by the Governor early in January.

More One-Man Cars in Atlanta

That one-man cars will be used wherever the operation of such cars is possible was indicated on Dec. 3 when the first of a new series of one-man cars was introduced by the Georgia Power Company on the Inman Park line, the oldest street-car line in the city of Atlanta.

There are now about 150 one-man cars in operation in Atlanta. In this connection company officials point out that the savings made by the use of the cars have been invested 50 per cent in increased service to the public, 25 per cent in increased trainmen's wages and 25 per cent in added income for the company. Company records, it was said, show an increase in patronage for the one-man car lines, indicating that they are well liked by the public.

Advertising the Liberty Bell Route in Pennsylvania

Two advertisements high in contrast but clever have been effective in creating interest for the Lehigh Valley Transit Company, operating in Allentown and points throughout southeastern Pennsylvania. They are features of an active, attractive campaign of advertising which the company has taken up with good effect in the newspapers throughout the territory it serves.

The Lehigh Valley Transit Company operates an electric line, with splendid parlor cars, to Philadelphia, at lower rates and more comfortable traveling, than the railroads. Receipts from the line are a big item in the yearly financial scheme and use of the road must be constantly pushed.

At that season of the year, when all of eastern Pennsylvania was observing the 150th anniversary of the carrying of the Liberty Bell from beleaguered Philadelphia to Allentown for hiding, the advertising force of the organization was producing clever copy with a historical basis.

The route to Philadelphia was named the Liberty Bell route in the very beginning. Recently, however, it was learned that the route very closely follows that of Frederick Leiser and John Jacob Mickley, who hauled the revered bell in their oxcart over the rough roads of that period to its hiding place beneath Zion Reformed Church in Allentown.

An advertisement is headed by a line drawing showing the fine trolleys of the route, with the old oxcart, bearing the Liberty Bell, just beside it. A map shows the conformity of the two routes, the one in the Revolutionary days and the other in the present.

From a humanitarian, as well as a business standpoint, the railway has taken cognizance of the very dangerous present to attract attention in another of its advertisements.

Every conceivable effort is being directed toward the elimination of accidents on the company's lines. They are costly in the extreme. Injury to human life means claims. Smashups mean property damages. Accidents often bring unjust condemnation.

The company took into consideration the recent opening of the Allentown schools. More than 16,000 children from the ages of six to eighteen left upon their journeys to school — journeys which were to be repeated almost daily. They crossed streets and tracks.

Consequently, the advertising forces devoted one large newspaper insertion to a timely co-operative message. They urged that teachers instill the safety idea into the children. They even offered suggestions for the youngsters to protect themselves when forced to cross heavily traveled streets.

Its very unselfishness, and the fact that it was obviously no outright advertising for the company's benefit, made the copy highly attractive. At the same time it effectively carried the idea that children could ride to schools in the trolleys in safety.

Recent Bus Developments

Bus Feeder Service Is Popular With Chicagoans

Popularity of the feeder bus line established in Chicago, Ill., last fall by the Chicago Surface Lines from the end of the Diversey Avenue car line to Laramie Avenue is shown by figures which have just been revealed for October, the second complete month of operation. During that period the big Fageol "Twin Coaches" used in this service carried 125,349 passengers. Although the Illinois Commerce Commission provided for operation of the line only to Laramie Avenue, applications for the extension of the bus service as far as the western city limits have recently been filed by several local business associations.

The November traffic and net earnings report, for the entire system, issued Dec. 20, shows a decrease of 317,859 in revenue passengers carried as compared with the month of November last year. The November total of 131,253,211 is also 4,166,012 less than the figure for October of this year. Earnings for November were proportionately lower.

Bus Request Put Over in Jacksonville

The request by the Jacksonville Traction Company, Jacksonville, Fla., of the City Council for permission to operate buses in Murray Hill has been referred by that body to the public service committee of the Council. The letter of the company asking permission to operate the bus service stated that the company intended to comply with all laws of the city, and outlined a schedule and route, but it was the sense of the majority of the Council that an agreement between the city and the company should be drawn by the city attorney before a permit was granted.

Bus Extension in Westfield Planned

Extension of its bus line in Westfield, Mass., is planned by the Springfield Street Railway, Springfield, Mass. This change will accommodate patrons not served under the present system of transportation. The State Department of Public Works and the City Council of Westfield have approved the expansion of bus service, but the Public Utilities Commission has taken the matter under advisement.

Buses the Talk of the Hour in Kansas City

Bus lines in Kansas City, Mo., their possible extensions, alterations of routes, and the question of additional equipment, is now being discussed by the directors of the Kansas City Public Service Company. The entire bus question is a lively issue now, with various communities asking a liberal use of buses on suggested "feeder lines." At present the question in Kansas City has two angles —the argument that bus lines should be more extensively employed in extending service to communities lacking railway service and, on the other hand, the financial losses.

The present fares are 10 cents on all bus lines except the express line in the Country Club district, which operates at a fare of 25 cents per person. The deficit in bus operation in 1926 was $307,000, but operating economies have reduced the loss this year to about $160,000. A new arrangement covering tires is said to have saved $75,000.

Bills to Regulate Interstate Commerce

Matter expected to be taken up actively after hearing before commission on Feb. 10. Digest of provisions of measures

TWO bills to regulate interstate buses have been introduced in the federal House of Representatives, one by Mr. Dennison of Illinois and the other by Mr. Parker of New York. The legislative committee of the Bus Division of the A.A.A. and representatives of the National Automobile Chamber of Commerce are co-operating in an effort to determine what ammendments if any are needed to make the bills more equitable and practicable. It is understood, however, that the House committee on interstate and foreign commerce will take no action on any bill until the proposed report of the Interstate Commerce Commission on its interstate bus and truck hearing is presented.

Bill Follows A.A.A. Principles

H.R. 19, introduced by Representative Dennison of Illinois, called the Dennison bill, generally follows the original ideas and principles laid down by the legislative committee of the Motor Bus Division of the A.A.A., of which S. A. Markel is chairman. A similar bill has been introduced by Senator Watson of Indiana, chairman of the Senate interstate commerce committee.

H.R. 5640, introduced by Representative Parker of New York, is identical with the Cummins bill of 1925. This provides for the regulation of both buses and trucks engaged in interstate commerce. The bill provides that the certificates of convenience and necessity be granted by the members of the State Regulatory Commission, acting as federal agents, with the right of appeal by the applicant to the Interstate Commerce Commission in case of adverse decision.

The Dennison bill automatically grants certificates to carriers operating in good faith at the time of the United States Supreme Court decision in the so-called Buck case, namely, March 3, 1925. Services on the highways started since that time are required to prove the convenience and necessity of their operation.

Another important difference between the Parker and the Dennison bills is that the latter requires the carrier to render service commensurate with the demand, whereas the Parker bill grants certificates only to individual vehicles and requires additional certificates to either increase or decrease the number of vehicles in service. Furthermore, the Parker bill requires that in fixing rates consideration be given to the kind and character of service to be performed, the public necessity therefor and the effect of such tariffs and rates upon other transportation agencies, with the idea of averting as far as possible unreasonable competition with existing services furnished by other carriers, motor or rail. This provision is not included in the Dennison bill, the nearest approach being Section 6C, which states:

> In determining whether or not public convenience and necessity warrants the granting of a certificate, the board or commission hearing such application shall give reasonable consideration among other pertinent matters to the public convenience and necessity and the character of transportation proposed, to available transportation services, to the character of service to be rendered by the applicant, and to the likelihood of proposed service being adequate, permanent and continuous.

Matter in Hands of Committees

At a meeting of the legislative committee of the Bus Division held in Washington on Dec. 2 to discuss the matter of interstate regulation a drafting committee was appointed to urge Representative Dennison and Senator Watson to introduce the bills mentioned in order to get the matter before the committees on interstate and foreign commerce. The whole matter of the regulation of the interstate bus and truck carriers is to be still further considered by a sub-committee consisting of S. A. Markel, George P. McCallum and E. W. Wakelee, who will draft any substitute provisions that might be required. Lorne Brown, representing the National Automobile Chamber of Commerce, will work with this subcommittee in a study of the need for amending the bill before hearings are held by the House interstate committee.

I.C.C. Argument Put Over Until Feb. 10

The Interstate Commerce Commission has announced that the argument in the Motor Bus and Motor Truck Docket has been reassigned from Jan. 16 to Feb. 10. Frequent reference to the comparative youthfulness of the bus and truck industry is made by various parties in the pages of this docket, and this fact is used as a plea that regulatory legislation for interstate traffic be postponed until conditions have become more stable. Regarding this contention, Commissioner Esch makes the observation:

I have in mind the thought that, had Congress regulated traffic by rail carrier years ago, much of the time and labor of the Interstate Commerce Commission might have been avoided, and many actions now brought to us for consideration might have been obviated.

For the purpose of bringing out the facts in this case, briefs were submitted on the behalf of the Erie Railway, the New York, New Haven & Hartford Railroad, the American Electric Railway Association, the Oregon State Highway Commission, the Association of Railway Executives, the Motor Coach Association of the State of Washington, and the Department of Public Works of the State of Washington.

The American Electric Railway Association brief, prepared by the late Charles L. Henry, general counsel, reviews the history of interstate commerce regulation and observes that beyond a doubt Congress intended in passing the regulatory act, to control all carriers. This brief goes on to show that many electric railways have supplemented their rail service by the operation of buses and, in doing this, have invariably sought authority from the states or municipalities. Such bus operation, it is contended, is frequently subject to competition from other bus lines pretending to be engaged in interstate business and are thus able to operate where they will.

Alfred P. Thom, general counsel of the Association of Railway Executives, prepared the brief submitted by that organization. His primary purpose is to dispel the idea that the desire to regulate interstate bus and truck traffic had its origin with the steam carriers.

The Motor Coach Association of the State of Washington believes that regulation of interstate bus and truck traffic is impracticable at this time, but expressed the opinion that such regulation, when necessary, can be more expeditiously administered by the state than by Congress.

A New Terminal for Buses in Springfield

A bus terminal has been established by the Springfield Street Railway, Springfield, Mass., at the Worthington Street terminal for all out-of-town buses. Previously the location of the Springfield terminal for these buses was at Court Street and permission was obtained from the transportation board to make the change. In anticipation of increased congestion at Worthington Street the company has secured an option on adjoining property which it plans to exercise. An addition to the building is planned.

To co-operate with the Springfield company a modification of the routing of buses of the New England Transportation Company is in prospect. This would be advantageous to bus patrons in making connections.

Claim of Prior Rights Disallowed

Commission holds a highly competitive service would be created if it sustained applicant's plea

THE Public Service Commission of Pennsylvania has restrained the City Transfer Company from operating motor vehicles on a schedule over fixed routes in Harrisburg until it obtains a certificate of approval.

The City Transfer Company was chartered on Jan. 6, 1904, for the purpose of "transferring persons and property to and from the railroad stations, from railroad station to railroad station, and to and from points in the city of Harrisburg and vicinity by means of coaches, cabs, carriages, wagons, horse power or automobiles or conveyances of similar character."

The company claimed that since it was chartered prior to Jan. 1, 1914, before the commission was organized, it did not need the commission's approval for its proposed scheduled service.

Upon the announcement of the company of its proposed plan to operate buses to various parts of the city, complaint against the proposed service was filed by the city and the Harrisburg Railways in the Dauphin County Court and a preliminary injunction was issued by the court.

By agreement of the parties the injunction was continued until the matter could be submitted to the Public Service Commission and determined by that body.

After declaring that a highly competitive service would be created if the commission sustained the transfer company's contention, the order said:

We are of the opinion that under our organic law, the interpretations of it by the court, and the administrative discretion which is lodged with the commission, there is authority for a duty resting upon us to sustain the complaints.

The route which the company proposed to establish and operate with 29-passenger capacity buses on a 10-cent fare was from Market Square to the John Harris High School. The major portion of the proposed route is now served by the Harrisburg Railways, which extended its lines to the High School in 1926.

A portion of the report of the commission says:

The City Transfer Company has never since its incorporation furnished any transportation service on a regular schedule between fixed terminals of the kind and character it proposes to inaugurate. The only service furnished by the company, prior to Jan. 1, 1914, in any way similar to scheduled service was the use for a short time, after its incorporation, of a horse drawn bus which in going to and from the railroad station made stops at three hotels to take on passengers to outgoing trains or deliver incoming passengers to these hotels, all located within a few city blocks of the railroad station.

As just indicated, the City Transfer Company attempted first to operate a route of buses on the theory that its state charter, being issued in 1904, did not bring it under the jurisdiction of the city or the commission. The city instituted injunction proceedings against the transfer company and the railway joined with the city. The transfer company, the city authorities and the railway appeared before the commission at a series of hearings.

This is believed to be the first time in the State of Pennsylvania that a transfer or taxicab company under charter from the state antedating the creation of the Public Service Commission has claimed that it could operate as a public utility without being under the jurisdiction of the state commission and obtaining a certificate of public necessity. If the commission had ruled otherwise than as it did, any other taxicab or transfer company in any city in the State could then have operated as a public utility without being under the jurisdiction of the Public Service Commission.

Partial Bus Substitution in Oakland Sought

The Key System Transit Company has applied to the California Railroad Commission for permission to discontinue railway service over its Rockridge line in the city of Oakland and to substitute bus service for a period of 90 days. It is proposed to operate on a twenty-minute headway.

Buses Out of Omaha Shorten Run

The Nebraska State Railway Commission has authorized the private persons now operating the buses once owned by the Omaha & Lincoln Light & Railway Company, a McKinley corporation, to curtail the length of their runs so far as the city of Omaha is concerned. The railway ran cars to Papillion and Ralston, but these proved to be losing propositions, and it was allowed to substitute buses. These were disposed of when the company was absorbed by a consolidation of power companies. The bus men said that they would have to cut out Papillion service if they had to duplicate the railway service from South Omaha to Omaha proper, and after a hearing and consultation with patrons served the schedule was rearranged to provide for a northern terminus at 24th and N Streets, Omaha.

Financial and Corporate

$2,650,000 Purchase of Central California Traction

The new agreement approved by the Interstate Commerce Commission under which the Southern Pacific, Western Pacific and the Santa Fe Railroads are to acquire joint control of the Central California Traction Company, operating an electric railway between Stockton and Sacramento, calls for the Fleishhacker interests to sell to the Southern Pacific, as of Dec. 31, 1927, all the outstanding stock and bonds of the electric railway for $2,650,000 in cash.

The Fleishhackers are to guarantee that the electric railway will have no indebtedness of any kind, except the principal amount of outstanding bonds and a proportionate amount of property-tax liability. If less than all the bonds are delivered by the seller, the agreed purchase price is to be reduced by the par value of any bonds of the carrier remaining outstanding in other hands.

The Fleishhackers further agree that within two years, at their own expense, they will remedy any defects or encumbrances affecting lands and rights of way of the electric railway, providing they are notified by the Southern Pacific by June 30 of next year. The ruling of the commission says:

Prior to the transfer of the stock and delivery of the bonds, the carrier (electric railway), in consideration of the guarantee personally assumed by the seller, is to convey to Fleishhacker the title to all its electric railway properties in the city of Stockton (a street car line operated under lease by the Stockton Electric Railway, which is a subsidiary of the Southern Pacific), with certain exceptions and reservations, and Fleishhacker, in turn, is to sell such properties to the Stockton Electric Railroad in consideration of the delivery to him of $100,000 of Pacific Electric Railway first refunding mortgage bonds.

The Southern Pacific agrees that immediately upon the acquisition of the carrier's stock and bonds, it will admit the Western Pacific and the Santa Fe to participation equally with the Southern Pacific upon payment by each of those carriers of one-third of $2,650,000 or such lesser sum as shall represent the purchase price of the securities.

Brief reference to this proposed purchase was made in the ELECTRIC RAILWAY JOURNAL in the issue of Dec. 10, page 1083.

$29,000,000 of Central Illinois Mortgage Bonds

Refunding operations of the Central Illinois Public Service Company, Springfield, Ill., in which the retirement of practically all of its higher rate issues and underlying bonds is contemplated, were brought to light recently with the announcement of an offer by Halsey Stuart & Company, Chicago, of an issue of $29,000,000 of the utility's 4½ per cent first mortgage bonds, series F. The bonds to be retired include three issues of first mortgage and refunding bonds in the principal amount of $16,450,000, with interest coupons ranging from 5½ to 6½ per cent and seven underlying issues amounting to $11,101,500. The proceeds of the new bonds will be used to reimburse the company's treasury for additions and extension to property as well as for the retirement of the higher interest bearing securities.

The present financing, it is pointed out, will result in a substantial saving in interest charges, simplification of the company's financial structure and an improvement in the mortgage position of the company's bonds.

Payment Date Postponed in O'Fallon Case

The Interstate Commerce Commission has postponed from Feb. 15 until April 30 the effective date of its order requiring the St. Louis & O'Fallon Railway to pay the government $226,000 of excess earnings. This action is taken to permit the carrier to appeal to the Supreme Court from a recent decision of the federal court in Missouri upholding the order of the commission.

Position of Third Avenue on Income Bond Interest Upheld

Judge John Knox in the U. S. District Court at New York has rendered a decision in favor of the Third Avenue Railway, New York, in an action brought by Thomas B. Jenkins and other holders of the adjustment 5 per cent bonds to have an injunction issued against the company restraining it from using its funds to promote bus service and requiring it to pay full 5 per cent interest and arrears on these bonds.

Judge Knox said in part:

The company, being confronted with peculiarities of transit conditions as they exist in this municipality, has been put to the necessity of acquiring control, through a subsidiary, of certain bus routes, which, if they come into possession of competing concerns, would have intefered seriously with earning capacity of the defendants.

In the main, the bus routes are closed by the defendants' lines of transportation, and in the hands of an antagonistic company the routes would be sharply competitive. To forestall this menace, I am of the opinion that the defendants' position in the premises is justified.

The accounting for which the plaintiff prays may show facts which will entitle him to some relief, but upon the present disclosure I am not satisfied that he should have injunction relief which is now sought.

The position of the company in the matter has been the subject of extended comment previously in the JOURNAL.

Operation to Cease in Albuquerque

The City Electric Company, Albuquerque, N. Mex., will discontinue operation on Jan. 1. About six months ago the company was placed in the hands of a receiver and the property was ordered sold for liens totaling approximately $59,000. Applications have been made for operation of buses in Albuquerque after Jan. 1, 1928.

With the cessation of railway service will pass the era of the motorettes, who have been operating the cars in that city since the days of the World War. The receiver has asked the business men to assist in obtaining work for the women who have been operating the cars.

Change in Name of Pennsylvania Company

The name of the Penn Public Service Corporation, a unit of the Associated Gas & Electric System, has been changed to the Pennsylvania Electric Company. This change in name is the only change, no merger or consolidation being contemplated. The Penn Public Service Corporation supplies railway service to the various boroughs and townships along the railway line from Philipsburg to Winburne, Pa., and also in the Borough of Du Bois.

North Shore Certificates Offered

A new issue of $720,000 par value equipment trust certificates of the Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., bearing interest at 5½ per cent was offered Dec. 13 by Halsey, Stuart & Company, Chicago. The issue is being sold at prices to yield from 5.25 to 5.50 per cent, according to the maturities, which range from Dec. 1, 1933 to Dec. 1, 1942, inclusive. The creation of these certificates has been authorized by the Illinois Commerce Commission and the Railroad Commission of Wisconsin.

No Par Stock for Public Service, New Jersey, Approved

Issuance by the Public Service Railway, Newark, N. J., of 12,500 shares of stock without par value was approved on Dec. 24 by the Public Utility Commission.

The only witness at the hearing on the petition was Edward A. Tuson, general auditor of the transportation companies of Public Service, who stated that the commission in 1917 had approved the issuance of 12,500 shares of common stock of a par value of $100 each; that the company had never issued that stock and that it now wished to issue the no par stock instead, as its common stock now is of no par value.

The stock of the Public Service Railway is owned by the Public Service Corporation of New Jersey.

Offer Made for Saskatoon Municipal Properties

An offer to pay $3,500,000 for the power and distribution plant and the railway at Saskatoon, Sask., and to divide the net profits from their operation with the city has been made by the Dominion Electric Light & Power Company, New York.

Bence, Stevenson & McLorg, acting in behalf of the intending purchasers, have written to the City Commissioner as follows:

We have just received instructions from the Dominion Electric Light & Power Company, Inc., to ask if the city would consider favorably an offer to purchase the power plant, poles, wires, and all equipment accessory and incidental to the manufacture and distribution of light and power to the city of Saskatoon, together with the railway, which, of course, is inclusive of all equipment and property used in connection therewith, at and for the sum of $3,500,000 cash.

If an agreement is arrived at our clients are prepared to spend the further sum of $1,500,000 on development of electric power and light.

In making the above inquiries our clients have in mind that the present rates for power and light remain, that the usual depreciation continue and that a sinking fund therefore be provided out of earnings.

An interest rate on the money invested is to be allowed and the rate to be agreed upon by both parties. Our clients will pay taxes.

Net profits, after providing for the above, are to be divided equally between the city and our clients.

With further reference to the rates as stated above, the present rates would be maintained subject, of course, to mutual agreement otherwise.

A franchise that would satisfy the legal requirements would be required.

New Issues for Stark Electric Approved by Commission

A $500,000 first mortgage 7 per cent bond issue of the Stark Electric Railroad, Alliance, Ohio, to be sold at 90 and the issuance of $250,000 of preferred stock to finance the retirement of a twenty-year $730,000 mortgage and outstanding notes have been approved by the Public Utilities Commission. That body has also amended an order of Nov. 16 concerning the sale of electrical equipment by the Stark Electric to the Alliance Power Company. The amendment authorizes the power company to purchase an easement right-of-way from Louisville to Damascus, Ohio, a distance of about 16 miles, for $22,500.

Approval of Massachusetts Interurban Stock Issues

New capital stock issues by the Boston, Worcester & New York Street Railway have been approved by the Massachusetts Department of Public Utilities. The company has secured approval of an issue of 7 per cent prior preferred stock for $10,000 in $100 shares, and an issue of 6 per cent preferred stock for $756,000 in $100 shares in lieu of $766,000 of outstanding common capital stock. The names, preferences, rights, restrictions, limitations and rates determined by the stockholders on Dec. 3, as applicable to the new stock, are approved. The company succeeded the Boston & Worcester Street Railway.

Scope of Securities Association Widened

Primary purpose of national association is to provide for collective action to improve credit of issuing corporations. Objectives of body will now embrace public utility securities

IN ORDER that the 70,000,000 citizens whose interests are involved may have a voice in the activities of the new Congress toward railroads and public utilities, the National Association of Owners of Railroad Securities laid down recently a program for the expansion of its functions. It will for the first time provide a means through which these actual owners may help guide the destinies of their properties.

At a meeting at the Bowery Savings Bank, some 50 of the members of the advisory and executive committees of the association voted to change its name to "National Association of Owners of Railroad and Public Utility Securities" so as to provide a more comprehensive understanding of the original purpose of the association, when it was established in 1917.

The meeting was called by Milton W. Harrison, president of the association and a trustee of the Bowery Savings Bank. Policies enunciated on Nov. 29 as determining the purposes of the association will go far, it is believed, toward helping Congress in respect to its responsibilities in matters relating to railroad and public utility industries.

Outstanding among the purposes of the association are the following:

1. To provide a method for collective action by owners of railroad and other securities for the purpose of maintaining and improving the credit of the corporations issuing them.

2. To protect and assist in steps for stabilizing the securities issued by railroads and other public utilities of the United States.

3. To organize, promote and carry out, in the public interest, a campaign of education, that the public may be informed of the extent to which all citizens are directly interested in the welfare of public utilities and railroads, and in the securities issued by them. Also to point the necessity for collective action to protect investments made in railroad, public utility, and other securities, in order that the credit of such corporations may be maintained, resulting in a better and more economical service to the people.

Milton W. Harrison was re-elected president of the association. Henry Bruere, New York, was appointed treasurer, and the following were elected district vice-presidents: Darwin P. Kingsley, president New York Life Insurance Company; T. K. Glenn, president Trust Company of Georgia, Atlanta; M. A. Traylor, president First Trust & Savings Bank, Chicago; I. H. Kempner, president United States National Bank, Galveston, Tex., and George I. Cochrane, president Pacific Mutual Life Insurance Company, Los Angeles.

General offices of the association will be maintained at 11 East 36th Street, New York. The present membership of the association will be extended to include such further individual and institutional owners of railway and public utility securities as may care to avail themselves of the association's advantages.

In outlining the scope and purpose of the work in hand, President Harrison said:

Changing the name of the association, with objectives that embrace public utility securities as well, effectively carries out the reason for the establishment of the national association in 1917. Since that date holders of railroad securities have become extensive investors in public utilities.

At present Congress and the commissions undertake to represent the investors without the help of the investors themselves. It becomes, therefore, an obligation of nation-wide importance that investors effectively put themselves in a position not only to be of constructive assistance to Congress and to regulatory commissions but to protect and stabilize the securities they own. Unwise legislation and regulation can do much damage to the soundness of security values because the industries behind such securities are under government control.

This association is in the happy position of desiring only the application of sound economic principles. Our interests are wholly parallel with those of legislatures, courts and regulatory bodies. No organization is so favorably positioned as ours to perform constructive service. The identity of our interest with that of the public interest will be apparent to all. But let this be clearly understood, our views will carry no weight unless we enunciate them.

With regard to railroads, of great importance to our interest is the question of primary valuations. The I. C. C. methods have been earnestly protested by parties at issue and with the greatest divergence of opinion. Several attempts have been made by protestants to secure review by the Supreme Court but such petitions have been dismissed pending the time the commission seeks to make practical application of its valuation findings. Such court review will probably be had in the early months of 1928. It is of great importance to us that valuation principles and procedure are still in a formative state and are susceptible of being molded by Congress and by courts along lines radically different from those adopted by the commission.

There are almost daily before the Interstate Commerce Commission finance dockets involving the issuance or retirement of security issues with which we are most directly concerned. There are pronounced

indications that the commission is slowly evolving a policy on financial structures which will in the future be controlling upon it. We should certainly know how our interests are affected in these cases and be in a position effectively to intervene when necessary. The relation between valuation for rate making and for taxation should be more earnestly studied and we should, I believe, participate constructively to inform the public on this and similar matters.

Tax Assessment of Capital Stock Reduced in Chicago

Holding that the tax assessment on capital stock of the Chicago Surface Lines, Chicago, Ill., made by the Illinois Tax Commission "amounted to virtual confiscation," Judge Victor P. Arnold of the Circuit Court has reduced the amount from $2,192,145 to $1,181,547. In a decision handed down Dec. 19, the court stated that the commission evidently ignored its own rules by not reviewing available evidence concerning actual value of the stock. The suit was of importance because it involved the question of how far the State Tax Commission can go in assessing taxes on the capital stock of corporations. The decision sustains the contention of the Chicago Surface Lines in every respect. The tax as fixed by the State Tax Commission and as fixed by the court as fair is as follows:

Company	State Tax Commission	Circuit Court
Chicago Railways	$798,150	$494,099
Calumet & South Chicago*	629,690	262,335
Chicago City Railway	764,304	425,113
Totals	$2,192,145	$1,181,547

* The amounts are for the years 1925 and 1926, except in the case of the Calumet & South Chicago to which the year 1924 is added.

Partial Abandonments in Auburn

The Public Service Commission approved a declaration of abandonment by the Empire State Railroad Corporation on Dec. 5 of what is known as the Clark Street line in Auburn and the West Genesee Street tracks. It was decided that the lines were no longer necessary for the public use. The fact was brought out at the hearing before the commission that the Empire company, now in the hands of a receiver, owed Auburn for paving taxes $12,173.

Mitten Building Purchased

The Mitten Bank Securities Corporation recently purchased from Mitten Management the Mitten Building, located at the northwest corner of Broad and Locust Streets, Philadelphia. The purchase price was $6,000,000, the same amount paid by Mitten Management when it bought the property. This building, with twenty floors, is one of the newest and most modern office structures in the central district. The first thirteen floors are occupied for the most part by Mitten Management and the offices of the Philadelphia Rapid Transit, while the Mitten tours motor-bus terminal is located on the ground floor.

Personal Items

Omaha Welcomes Mr. Shannahan

New president is guest of honor at luncheon. Newspaper comment favorable and helpful in tone

JOHN N. SHANNAHAN, new president of the Omaha & Council Bluffs Street Railway, Omaha, Neb., was guest of honor on Dec. 19 at a luncheon by J. E. Davidson at the Fontenelle, Omaha. One hundred and fifty business men attended. He said in part:

To come to a city where I know almost no one and get a welcome like this makes my job look much easier than it did ten days ago, he began. I have never lived away from the Atlantic seaboard, and my friends told me they wondered why I came to Omaha. The reason the invitation appealed to me so strongly is this: The electric railway business of the country is in a particularly critical state at this time. If I can work out the situation satisfactorily here, give Omaha a transportation system it should have and put the company on a dividend basis—not only in dollars and cents but in good will and friendship—then possibly I will show my brothers in the industry the way out of their difficulties.

Realizes Difficulties of Job Ahead of Him

And this cannot be done without your assistance. I am conscious I have undertaken a difficult job. A railway is the servant of the public, and I regard myself as much of a servant as your mayor or the policeman on your streets. My aim is to make Omaha's railway an asset to the city. A dilapidated, "run down at the heel" railway system is the poorest advertisement a city can have. I want your suggestions, and the door of my office will always be open. If you think you can be of assistance, pay me a call.

Under the title "Welcome, Mr. Shannahan, the Omaha *World-Herald* of Dec. 20 said in part:

Mr. Shannahan has come to serve as president of the railway at a very troublesome and critical time in the history of that corporation. He comes with a shining record of success as a doctor of sick public utilities, due in part, it is said, to his technical competence and broad understanding of such problems, and in other part to an exceptional gift for winning public confidence and support by deserving to win it.

Newspapers Favorably Disposed

The *World-Herald* hopes that the new president may prove all that he is cracked up to be, and that he may achieve another notable success by putting the company back on its feet and by establishing a genuine entente cordiale between it and its patrons, the people of Omaha. And we should not be at all surprised if he does it, difficult though the task appears. For Mr. Shannahan impresses the stranger as a candid, fair-minded and straightforward man, at once earnest and tactful.

An executive such as he should need to go not much more than half-way to find that the most of his troubles are little ones, after all. For Omaha has no war to wage on the railway. Omaha wants to see it a successful and well-managed corporation, and is cheerfully willing that it should earn a fair profit on honest and prudent investment. At once for the company's good and for the city's good it is to be hoped that as much can be done for the railway as for other public service corporations. The *World-Herald* welcomes John Shannahan to Omaha not only as a railway executive but as a citizen, and hopes that his days among us may be long and pleasant and freighted with usefulness.

Clark V. Wood, Jr., Official of New England Transportation

Clark V. Wood, Jr., has been appointed assistant supervisor of the Connecticut lines of the New England Transportation Company, subsidiary of the New York, New Haven & Hartford Railroad. He has in the past been connected with the Springfield Street Railway and the United Electric Railways, Providence.

L. E. Lynde Transportation Division Manager at Boston

L. E. Lynde has been appointed manager of the transportation division of the Boston office of the Westinghouse Electric & Manufacturing Company. Mr. Lynde has been with the Westinghouse company since 1920, and during the past several years has been located in its New York office, where he was engaged in transportation activities.

Mr. Lynde was born in Dover, N. H. He was reared there and was graduated from the University of New Hampshire. He is a member of the New York Railroad Club, American Electric Railway Association and Theta Chi fraternity.

During the war Mr. Lynde served overseas as an officer with the A. E. F.

Mr. Lynde succeeds H. S. Day, who recently resigned to become superintendent of equipment for the United Electric Railways, Providence.

Joe R. Ong Studies Winnipeg System

Joe R. Ong, transportation engineer of the Cincinnati Street Railway, Cincinnati, Ohio, has just returned to Cincinnati from Winnipeg, Manitoba, where he has been engaged for several weeks as consultant on matters relating to the railway utility of the Winnipeg Electric Company.

Mr. Ong became connected with the Cincinnati Street Railway in February, 1926, shortly after its reorganization and is in charge of transportation engineering matters and the traffic studies

that are proceeding along with the rehabilitation of the property. He has been serving the Winnipeg company on a special leave of absence from the Cincinnati system.

Other railway properties with which Mr. Ong has been identified as transportation engineer or as consultant include the Georgia Power Company, Atlanta; the Kansas City Public Service Company, Kansas City, Mo.; the Los Angeles Railway and the Northern Ohio Power & Light Company, Akron. He was formerly electric railway engineer on the staff that served jointly the Railroad Commission of Wisconsin and the Wisconsin Tax Commission and conducted service studies and appraisals on many of the Wisconsin properties including the Milwaukee Electric Railway & Light Company.

W. Nelson Smith with Engineers

W. Nelson Smith, connected with the Winnipeg Electric Company, Winnipeg, Man., for some years and more recently assisting several prominent engineering firms on heavy electric traction projects, has become connected with the organization of the E. L. Phillipps & Company, engineers, 50 Church Street, New York, N. Y. Mr. Smith returned to Winnipeg in 1925 after an absence of about a year in Vancouver, where he assisted Sydney E. Junkins & Company, Ltd., in preparing a report on the electrification of the Canadian Pacific Railway. After his return he was engaged for a time in the valuation of the light and power distribution systems of the Winnipeg Electric Company. Mr. Smith's experience in steam railway electrification work covers a period of more than twenty years. After designing a number of interurban railway systems, he took a leading part in the laying out of the electrification of the Erie Railroad at Rochester, N. Y., and the Long Island Railroad.

Edison Medal Awarded to William D. Coolidge

The Edison Medal has been awarded by the Edison medal committee of the American Institute of Electrical Engineers to Dr. William D. Coolidge, "for his contributions to the incandescent electric lighting and the X-Ray arts."

The Edison Medal was founded by associates and friends of Thomas A. Edison, and is awarded annually for "meritorious achievement in electrical science, electrical engineering, or the electrical arts," by a committee consisting of 24 members of the American Institute of Electrical Engineers.

The medal has in the past been awarded to Elihu Thomson, Frank J. Sprague, George Westinghouse, William Stanley, Charles F. Brush, Alexander Graham Bell, Nikola Tesla, John J. Carty, Benjamin G. Lamme, W. L. R. Emmet, Michael I. Pupin, Cummings C. Chesney, Robert A. Millikan, John W. Lieb, John White Howell, Harris J. Ryan.

Dr. Coolidge is assistant director of the research laboratory in the General Electric Company, physical chemist.

OBITUARY

B. C. Edgar

Official of Tennessee utilities an executive of wide experience. Firm believer in value of good public relations

B. C. EDGAR, vice-president and general manager Tennessee Electric Power Company and president of the Nashville Railway & Light Company, died on Dec. 26 at his home on Lookout Mountain, Chattanooga, Tenn. Mr. Edgar, for many years prominent in the utility field for the important posts he filled so acceptably, had been ill for a long time.

Mr. Edgar was always a firm believer



B. C. Edgar

in the policy of maintaining good public relations and meriting the confidence of the utility's customers, and in giving complete publicity to the affairs of his companies through the daily newspapers and the weekly press of Tennessee. Under his guidance the local utility became one of the leading public service organizations of its kind, not only in the South, but throughout the nation, furnishing electric light and power service for more than 100 communities in Middle and East Tennessee.

He always took an active interest in the affairs of the electric light and power industry. In 1926-1927 Mr. Edgar served as president of the National Electric Light Association, southeastern division, comprising light and power companies and those identified or affiliated with the electrical industry in the states of North and South Carolina, Georgia, Florida, Alabama and Tennessee. He presided at the last convention of the association held in Memphis in April of this year.

Mr. Edgar was first employed by the Manhattan Railway, New York City, in changing from steam-driven trains to electrical operation. Later he became identified with the electrification of the tubes under the Hudson River at New York City.

From 1909 to 1912 he was in San Francisco and in Portland, Ore., with the Southern Pacific System. Among his task was one connected with the electrification of suburban railway lines from Oakland to Berkeley, Cal. From 1912 to June, 1914, Mr. Edgar was assistant general superintendent of the Columbus Railway, Power & Light Company, Columbus, Ohio. He was made general superintendent of the Nashville company in the latter year, and in February, 1919, he was elected to the vice-presidency of the Chattanooga Railway & Light Company, the Nashville Railway & Light Company and the Tennessee Power Company. When the Chattanooga Railway & Light Company and the Tennessee Power were merged in February, 1923, with the Chattanooga & Tennessee River Power Company into the Tennessee Electric Power Company Mr. Edgar was continued as vice-president and general manager of the merged company. In December, 1925, he became president of the Nashville company. Under his administration the Tennessee companies have grown greatly.

Mr. Edgar was born in Rahway, N. J., in 1878. In his early boyhood he became interested in the rapidly developing science of electricity. He was graduated in electrical engineering from Rutgers College, New Brunswick, N. J., in 1900.

WILLIAM G. MATTHEWS, superintendent of way and buildings of the Denver Tramway, Denver, Col., died Dec. 3. Mr. Matthews joined the tramway in 1891. At that time the system was run by cable. He worked in various departments up to 1920, when he was appointed maintenance superintendent, the position he filled up to the time of his death.

JOSEPH HORACE GOODSPEED, at one time affiliated with the West End Street Railway, the predecessor of the Boston Elevated Railway, Boston, Mass., died on Dec. 11.

J. PHILIP PHINIZY, a director of the Georgia Power Company, Atlanta, Ga., died recently at his residence in Athens. He was president of the Southern Manufacturing Company and president of the Southern Life Insurance Company. Mr. Phinizy was 66 years old. He was an alumnus of the University of Georgia.

CHARLES D. STANFORD, Maine capitalist, instrumental in the promotion of the electric railway in Bangor, Me., died Nov. 8 in Bangor. Years ago he foresaw the advantages of the electric railway and was one of the promoters of the Bangor Street Railway. He was also connected officially with the power developments of the Bangor Hydro-Electric Company, which controls most of the power developments and railways in that section. Mr. Stanford was 81 years old.

Manufactures and the Markets

Ten New Cars for New York, Westchester & Boston Railway

Ten electric passenger cars are being ordered by the New York, Westchester & Boston Railway, New York, N. Y.

The car bodies and trucks will be Osgood-Bradley, electrical equipment Westinghouse Electric & Manufacturing Company and air brakes Westinghouse Air Brake Company.

The units, it is understood, will be similar in design to the twenty cars previously ordered and mentioned in the JOURNAL for Aug. 21, 1926. The latter have an overall length of 72 ft. 7¼ in. and seat 80 passengers.

The new cars will be delivered in the spring and will be used on the extension under construction between Harrison and Rye, N. Y.

Westinghouse Veteran Promoted

I. F. Baker has been promoted to manager of the Far Eastern department of the Westinghouse International Company. He comes to his new position from Japan, where he was managing director of the Westinghouse Electric Company of Japan, president of the American Merchants Association of Tokio, and acting president of the American Association of Tokio. His new offices will be in New York.

Mr. Baker is a veteran in the Westinghouse company. He entered the company as an apprentice in 1909, graduating into the industrial sales department, East Pittsburgh, in 1910; was transferred to the Westinghouse Electric Export Company at East Pittsburgh in 1913; was made commercial engineer in the Westinghouse Electric International Company of New York, in 1918, and sent to Tokio, Japan, as a manager for Japan in 1919. Six years later he was promoted to managing director of the Japan Company, which position he held until his recent transfer to New York.

New Viaduct to Eliminate Grade Crossing in East St. Louis

The grade crossing of the Terminal Railroad Association and the East St. Louis & Suburban Railway at 21st and State Streets, East St. Louis, Ill., it is reported will be eliminated by the construction of a reinforced concrete viaduct to carry the railroad tracks above State Street, which will be depressed from 6 to 8 ft. Detailed plans have not been prepared, but the project will cost about $300,000. The cost, it is understood, will be shared by the Terminal, the East St. Louis & Suburban and the city.

Originally it was planned to construct a similar viaduct to eliminate the Southern Railroad belt grade crossing two blocks away, but the special committee on grade crossing separation appointed by the East St. Louis Chamber of Commerce and the representatives of the railroads and city officials decided to compromise by constructing only the terminal viaduct at this time.

It is planned to depress State Street from 6 to 8 ft. and to elevate the terminal tracks about 10 ft. above the present level.

Big Motor Order Placed by London Underground

An order for twenty new steel motor motors, each of 240 hp., has been placed by the London Underground Railways with the General Electric Company. The order also includes equipment for 63 motor coaches and 107 trailer cars. Six hundred and twenty-eight coaches of the London Underground system have been similarly equipped by the same concern. The new order, according to reports, is the first part of the complete overhauling scheme recently initiated by the London Underground.

Twenty Motor and Trail Cars for Illinois Central

An order for twenty new steel motors and trailer passenger cars for use in its electrified Chicago suburban service was placed Dec. 24 with the Pullman Car & Manufacturing Corporation, Chicago, by the Illinois Central Railroad, Chicago, Ill. The new cars, seating 84 passengers each and all equipped with roller bearings, increase the company's electrically operated equipment to 280 units. Delivery of the cars, which are estimated to cost between $900,000 and $1,000,000, is promised for 1928.

Five Railways and Subsidiaries Receive Mack Buses

Deliveries of Mack buses to electric railways and their bus operating subsidiaries recently reported by the International Motor Company's bus department follow:

Utah Light & Traction Company, Salt Lake City, Utah, has received five Mack bus chassis, two 230-in. wheelbase and three 196-in. wheelbase.

Hamburg Railway, Hamburg, N. Y., operating an extension bus line from its city limits terminal into Buffalo, has received a Mack bus, a 25-passenger parlor car bus, 230-in. wheelbase, four-cylinder motor, for de luxe service.

Boston Elevated Railway, Boston, Mass., has accepted delivery on two Mack buses. city type, 29-passenger capacity, four-cylinder motors.

Connecticut Company, New Haven, Conn., has accepted delivery on five 29-passenger city type Mack buses, four-cylinder motor, 225-in. wheelbase.

Public Service Transportation Company, bus operating subsidiary of the Public Service Corporation of New Jersey, Newark, N. J., has received three Mack parlor car buses, 25-passenger capacity, 230-in. wheelbase, four-cylinder motor.

Expansion Program in Los Angeles Not Yet Determined

Not until the California Railroad Commission hands down its decision in the case affecting rates on the Los Angeles Railway, Los Angeles, Cal., will the company be in a position to determine in detail the program for expansion which it is understood to have in mind. The hearing in the rate case was held last May, but the commission has not yet acted upon the appeal made to it. The company is not now in a position to add any more cars of the so-called 2501 type, and it will, it is understood, continue with its present rolling stock equipment until such time as the commission has rendered its decision.

New Pension Plan Announced by General Electric

A contributory pension plan, whereby employees pay in a small part of their wages from year to year to a pension fund, supplementing the old age pension system which the General Electric Company has had in effect since 1912, has been announced by Gerard Swope, president of the company.

At the same time Mr. Swope announced the creation of a pension trust. Instead of the company carrying a reserve on its balance sheet sufficient to meet its obligation to employees reaching the retiring age, $5,000,000 has been turned over to the trustees of the new trust by the company.

Pensions at present are computed at 1½ per cent of the earnings of employees for each year of continuous service. Under contributory plan of additional pensions, which it is proposed to make effective Jan. 1, 1929, 1½ per cent of the annual earnings of the employees will be turned over to the custodians, a board of seven, on which the employees will have representation. This money will be invested and held for the employees individually. Interest will be allowed to accumulate.

The retiring age in the past has been 70 years for men. Under the new plan it is proposed to make this 65 years for men and, as at present, 60 years for women.

N.Y.R.T. Gets 600-Volt, 4,000-Kw. Converter

The Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has recently furnished to the New York Rapid Transit Company a 4,000-kw., 600-volt converter which is a dupli-

cate of a machine already installed in the same station. The new machine is a 4,000-kw., 575-volt, direct-current, shunt-wound converter. It is supplied from a three-phase, 4,200-kva., 11,000-volt, 25-cycle power transformer. The equipment is operated by means of supervisory control from the New Utrecht station.

$2,578,296 for Kansas City Rehabilitation Program

The budget of $2,578,296 for completion of the rehabilitation program of 1928 of the Kansas City Public Service Company, Kansas City, Mo., has been submitted to Dr. Saunders, of the executive committee and his associate members, Powell C. Groner, president of the company, and Col. E. M. Stayton, city representative. It includes $1,018,180 for overhauling and rebuilding cars, $933,228 for new tracks, and $240,588 for special track work at intersections. The committee will report to the directors at a meeting to be held within a few days.

The franchise promised a rehabilitation program of $6,600,000 to be finished within three years. Last year under the regime of William G. Woolfolk as president, expenditures approximating $4,000,000 were authorized and for the most part completed.

Montreal Tramways and City Decide on Car Tunnel

The city of Montreal and the Montreal Tramways, according to reports, have decided to tunnel under the Lachine Canal on Wellington Street, the work to cost between $7,000,000 and $8,000,000. In a recent interview Julian Smith, president of the tramways company, stated that as a result of long-continued negotiation with the city an agreement had been arrived at between the city of Montreal and the tramway. The project has now been given the approval of the Tramways Commission, subject to the approval of the Dominion government and subject to contribution by the Dominion government toward the expense of the work of putting the tramway lines on Wellington Street and Verdun Avenue into tunnels beneath the canal and building new lines so that through cars could be operated from St. Catherine Street into Verdun and Pointe St. Charles.

With the construction of the tunnel under the canal on Wellington Street the Wellington Street service will be greatly improved and the long delays which have been due to the bridges will be eliminated, and a substantial gain in reducing delays to shipping will also result.

Negotiations are now taking place with the Dominion government looking to their approval, in principle, of this undertaking and to an agreement by which the government will bear its share of the expense. Advices are to the effect that it is hoped if the government comes to a prompt decision in this matter the work can be commenced on one of these undertakings and completed before the opening of navigation in 1928.

Exhibitograph No. 1

Good News

The 47th A. E. R. A. convention and exhibit are to be held in

Cleveland

Sept. 22-28, inclusive

Let your New Year resolution be to stage an exhibit at the next A. E. R. A. convention. That's the place to talk turkey.

Quiet and Steady Metal Markets

The customary and expected holiday quietness characterizes the metal markets for the week ended Dec. 28, and no change is expected until after New Year's Day. Prices, however, have been steady.

The large producing interests have continued to quote 14⅛ cents for domestic deliveries of copper in the East all week. A fair amount of business was done in the Middle West Dec. 23 at 14¼ cents, however. The custom smelters have in general quoted 14 cents delivered in Connecticut, since Dec. 22, when the last of the 13⅞ cents copper was absorbed. The price of the export association continues at 14.50 cents, c.i.f.

The leading interest in the Middle West quoted lead 6.325 cents all week, but business done at this figure was all but negligible, virtually all the sales by this company being on an "average" price basis. Other sellers did a fair business at 6.30 cents.

Some zinc has found a market at 5.625 cents in the week ended Dec. 28, but the price to consumers has generally ruled at 5.65 cents, St. Louis, for all deliveries. High-grade is neglected, with nominal quotations for spot carloads remaining at 7¾ cents delivered.

Tin prices are a little lower than they were a week ago. Straits suffered more than 99 per cent metal and the spread between the two today is only ⅛ cent. Compared with spot Straits, January and February are off about ⅛ cent, and March and April about ¼ cent.

METAL, COAL AND MATERIAL PRICES
F. O. B. REFINERY

Metals—New York	Dec. 27, 1927
Copper, electrolytic, cents per lb.	13.80
Copper wire, cents per lb.	15.75–16.00
Lead, cents per lb.	6.50
Zinc, cents per lb.	6.00
Tin, Straits, cents per lb.	58.125
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	.....
Somerset mine run, Boston, net tons	.....
Pittsburgh mine run, Pittsburgh, net tons.	.....
Franklin, Ill., screenings, Chicago, net tons	1.60
Central, Ill., screenings, Chicago, net tons	1.50
Kansas screenings, Kansas City, net tons	2.175
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	5.50
Weatherproof wire base, N.Y., cents per lb.	16.50
Cement, Chicago net prices, without bags.	2.05
Linseed oil (5-bbl. lots), N.Y., cents per lb.	10.6
White lead in oil (100-lb. keg), N.Y., cents per lb.	13.25
Turpentine (bbl. lots), N.Y., per gal.	0.60

TRADE NOTES

Lincoln Electric Company, Cleveland, Ohio, announces the appointment of R. M. Plympton as salesman in charge of consumer motor business in Chicago. He will work under the direction of R. D. Malm, Chicago district manager. Mr. Plympton was formerly assistant sales manager for the Babson Statistical Association, Wellesley Hills, Mass.

Manning, Maxwell & Moore, Inc., New York, to co-ordinate the handling of its business, has organized two operating companies under the laws of Delaware, the Consolidated-Ashcroft-Hancock Company and the Shaw Crane-Putnam Machine Company. Manning, Maxwell & Moore, Inc., owns all the stock of both corporations. The Bridgeport and the Boston plants of Manning, Maxwell & Moore, Inc., and the sales force marketing the products of these plants will make up the Consolidated-Ashcroft-Hancock Company. The Shaw Crane-Putnam Machine Company takes over the Shaw Crane Works and the Putnam Machine Works and the sales activities pertaining to them. The supplies department and the Chicago machinery branch office of Manning, Maxwell & Moore, Inc., operate as formerly.

Railway Track-Work Company, Philadelphia, Pa., has sold to the Tulsa Street Railway, Tulsa, Okla., a "Vulcan" rail grinder and a "Eureka" rail joint grinder.

Ohio Brass Company, Mansfield, Ohio, has published booklet No. 519, entitled "The Dirge of a Dime (Ten Cents)." It contains amusing illustrations and text.

Truscon Laboratories, Detroit, Mich., has issued a folder descriptive of its products for the protection of steel, concrete and masonry, and wood.

Wagner Electric Corporation, St. Louis, Mo., has issued bulletin No. 153, loose-leaf, describing the Wagner split-phase induction motor, type 58RB, ⅛, ⅙ and ¼ hp.

Silent Hoist Winch & Crane Company, Inc., Brooklyn, N. Y., has issued bulletin No. 30, descriptive of its different types of silent hoist motor truck and power winches.

Sullivan Machinery Company, Chicago, has recently issued looseleaf bulletin 81-O and 81-Q, descriptive of its auger rotators, class "H-8," and "rotator" rock drills, "L-5" medium, "L-3" heavy model. Both of the bulletins are illustrated.

Ten Semi-Steel Cars Being Built for Boston Elveated

The ten cars ordered by the Boston Elevated Railway, Boston, Mass., on Aug. 3 from the Laconia Car Company, Laconia, N. H., as announced in the Aug. 20 issue of the JOURNAL, are to be delivered during the 40-day period between Dec. 1, 1927, and Jan. 10, 1928. They are to be placed in service in South Boston and will replace the old box cars now in use there.

The cars, with a seating capacity of 48, are being built at a cost of approximately $12,000 each. They are of the one-man, two-man, double-end, double-truck type, having a total weight of 31,460 lb. and a length over all of 45 ft. 0 in. The body is of semi-steel construction with end doors and has an arch roof. The seating arrangement includes four longitudinal and sixteen cross seats, with a spacing of 29⅝ in. The painting scheme is to be yellow.

Operating equipment includes four G.E. 264-A inside-hung motors, G.E. K-71 control and Westinghouse air brakes with variable load attachment.

The official specifications are as follows:

No. of units	10
Type of unit	One-man, two-man, motor, passenger, city, double end, double truck
Seating capacity	48
Builder of car body	Laconia Car Company
Date of order	August 3, 1927
Date of delivery	Dec. 1, 1927, to Jan. 10, 1928
Weights:	
Car body	13,800 lb.
Trucks	8,700 lb.
Equipment	8,960 lb.
Total	31,460 lb.
Bolster centers	20 ft. 9 in.
Length over all	45 ft. 0 in.
Length over body posts	30 ft. 11½ in.
Truck wheelbase	5 ft. 2 in.
Width over all	8 ft. 6½ in.
Height, rail to trolley base	10 ft. 7½ in.
Window posts spacing	31½ in.
Body	Semi-steel
Roof	Arch
Doors	End, folding
Air brakes	Westinghouse, variable load attachment
Armature bearings	Plain
Axles	Pittsburgh Forge & Iron Company
Compressors	DH-16
Conduit	Flexibe
Control	General Electric K-71
Couplers	Malleable iron sleeve
Destination signs	Keystone
Door mechanism	National Pneumatic Company
Energy-saving device	Railway Improvement Co.
Fare boxes	Johnson
Finish	Flood-Conklin
Floor covering	Wood
Gears and pinions	General Electric spur
Glass	Double thick
Hand brakes	National staffless
Hand straps	Rico
Heat insulating material	Salamander
Heaters	Consolidated Car Heating Company
Headlights	Derssel
Headlining	Bronze and malleable iron
Journal bearings	Plain
Journal boxes	Steel castings
Lamp fixtures	Weber No. 61000
Motors	Four General Electric 26-A, inside hung
Registers	International single
Roof material	Wood and canvas
Seats	J. G. Brill Co.—4 longitudinal
Seat spacing	29⅝ in.
Seating material	Wood slat
Slack adjusters	M-1
Steps	Folding
Step treads	Wood universal tread nosing
Trolley catchers	Earll
Trolley base	Ohio Brass
Trucks	Taylor, type LRH
Ventilators	Garland
Wheels, type	Steel, 26-in. diameter
Wheelguards	Wood life guards on trucks

{ *Electric Railway Journal, October 8, 1927, page 722.* }

Ten more for the Boston "L" equipped with

"Peacock" Staffless Brakes

Reg. U. S. Pat. Off.

To replace the old box cars now in use in South Boston the Boston Elevated Railway has ordered ten one-man, two-man, double-end, double-truck type cars from the Laconia Car Company, Laconia, N. H., equipped with "Peacock" Staffless Brakes.

Whenever and wherever new cars are ordered, in every type of service, "Peacock" Staffless Brakes will usually be found in the specifications.



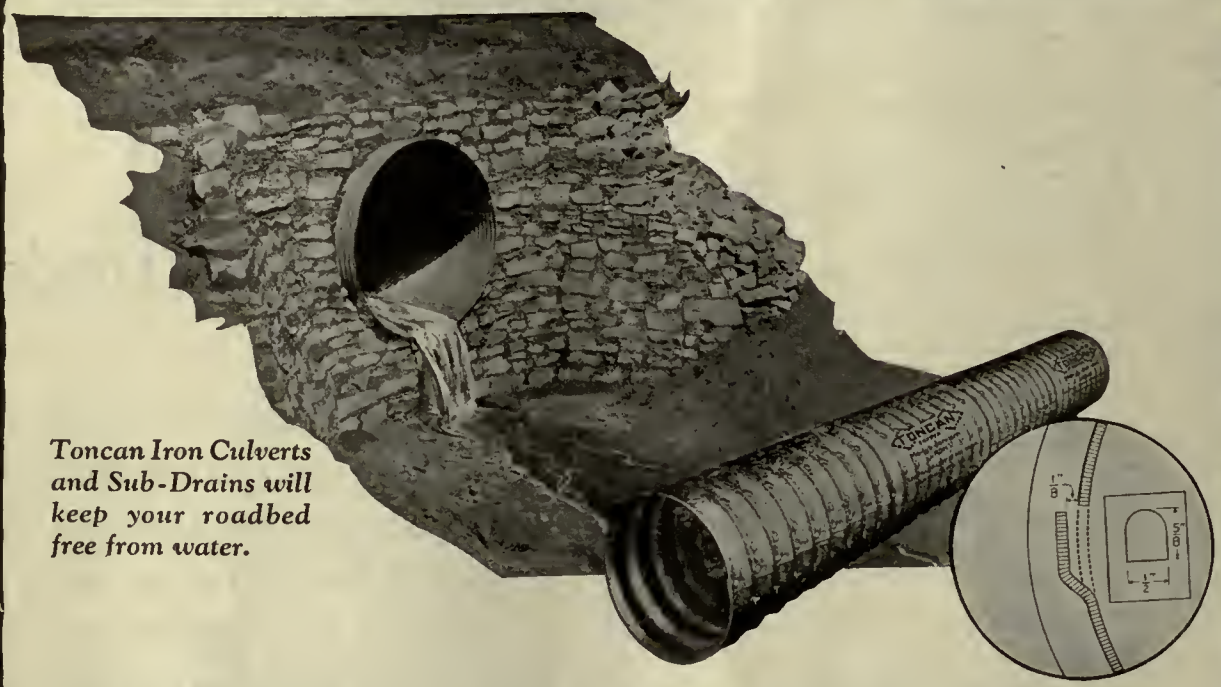
May we give you the reasons?

National Brake Company, Inc.

890 Ellicott Square, Buffalo, N. Y.

Canadian Representative

Lyman Tube & Supply Co., Ltd., Montreal, Can.



Toncan Iron Culverts and Sub-Drains will keep your roadbed free from water.

Sub-Drains Of Toncan Iron Last Longer and Work Better

TONCAN COPPER Mo-lyb-den-um IRON

Following are the makers of Toncan Culverts. Write the nearest one:

The Berger Mfg. Co., of Mass. Boston, Mass.
The Berger Manufacturing Co. Dallas, Texas
The Berger Manufacturing Co. Jacksonville, Florida
The Berger Manufacturing Co. Minneapolis, Minn.
The Berger Manufacturing Co. Philadelphia, Pa.
The Berger Manufacturing Co. Roanoke, Virginia
The Canton Culvert & Silo Co. Canton, Ohio
The Firman L. Carswell Mfg Co. Kansas City, Kan.
The Pedlar People Limited, Oshawa, Ontario, Canada
Tri-State Culvert Mfg. Co. Memphis, Tenn.
The Wheat Culvert Co., Inc. Newport, Ky.

SUB-SURFACE water is a great roadbed disturber. It causes misalignment and uneven track. Remove it and you remove one cause of track maintenance.

Cuts, sags and similar collectors of water all need sub-drainage for the protection of the roadbed.

Toncan Iron Drains have all the advantages of corrugated metal drains and two more:

1. They retard the entrance of dirt by the use of outward tongued perforations instead of usual holes.
2. They are made of Toncan Copper-Molybdenum Iron and therefore possess higher resistance to corrosion and erosion. Copper and molybdenum are alloyed with refined iron to give longer life.

Drains of Toncan Iron give better drainage, eliminate breakage and reduce maintenance for many years to come. Look into this vital Drain improvement made only in Toncan Iron.

CENTRAL ALLOY STEEL CORPORATION, *Massillon*, OHIO
World's Largest and Most Highly Specialized Alloy Steel Producers
Makers of Agathon Alloy Steels
Cleveland Detroit Chicago New York St. Louis
Syracuse Philadelphia Los Angeles Tulsa
Cincinnati San Francisco Seattle

TONCAN COPPER MO-LYB-DEN-UM IRON


RUGGEDNESS
International Creosoted Pine Lines are rugged to the last. Southern Yellow Pine is 44% stronger than the nearest other commonly used pole species and the strength of individual poles is unusually uniform. This great strength is made permanent by creosoting—safeguarding the poles against decay, white ants, woodpeckers, grass fires and storm damage.
International Creosoted Poles are particularly valuable for cross country transmission lines. They add reliability to the less accessible lines. This is important because a pole failure that is hard to reach means long delay, seriously interrupted service, and costly replacement. Build your lines with International Creosoted Pine Poles. They give greatest strength and greatest protection to service at lowest annual cost.
Illustration shows International Poles used for three-pole and two-pole construction. Length of spans vary from 500 to 1,800 feet. Line built to give strength comparable to steel. Poles used on 66,000 volt line, Chillicothe to Jackson to Floodwood, in service of the Southern Ohio Electric Co.
International Creosoting & Construction Co.
Galveston—Texarkana—Beaumont
Distributed by
GraybaR
ELECTRIC COMPANY
OFFICES IN ALL PRINCIPAL CITIES
International
Creosoted Yellow Pine Poles

ANNUAL

Statistical and *Forecast* *Number*

Electric Railway Journal
January 14, 1928

This important number will contain:

Record of 1927 in costs and revenues.

Number of cars purchased.

Miles of track constructed and reconstructed.

Financial records for 1927.

Reviews of basic tendencies in legal, financial and regulatory matters.

A review of the significant news developments of 1927.

Together with:

A forecast of 1928 expenditures in all departments, and the trends which will shape developments and progress of 1928.

Advertising forms close January 3, 1928

Electric Railway Journal
Tenth Ave. at 36th St., New York City

Member ABC Member ABP

Studebaker

Announces a New Bus Chassis for fast Highway Service



High Speed Bus Chassis by

STUDEBAKER



MORE SPEED

With Less Weight

Studebaker Bus Models and Prices

"75" Model—184" wheelbase, dual rear wheels chassis only	$3275
21-Pass. Street Car Bus ("75" model chassis)	5895
"75" Special High Speed Chassis—184" wheelbase dual or single rear wheels (chassis only)	2775
19-Pass. Cross-Seat Sedan on "75" special chassis	5275
20-Pass. Parlor Car De Luxe on "75" special chassis	6395
22-Pass. Observation Parlor Car on "75" special chassis	6395
"75" Junior Model—158" wheelbase (chassis only)	2410
12-Pass. Cross-Seat Sedan on "75" Jr. chassis	4160
15-Pass. Cross-Seat Sedan ("75" Jr. chassis)	4520

All prices f. o. b. factory. Purchase can be arranged on Studebaker's liberal budget payment plan

Again Studebaker has produced a bus chassis which fully meets present day traffic conditions and the operator's requirements on long, fast schedules. This new "75" special high speed chassis has a wheelbase of 184 inches. It has 800 pounds less weight than the "75" heavy duty chassis. All "75" chassis because of recent motor refinements have greater power—the present Studebaker six-cylinder engine develops over 90 h.p. at 2600 r.p.m. The specially designed three speed forward transmission and rear axle with the more powerful motor and with less weight to carry, permit quicker acceleration, more speed on the road and greater economy of operation.

The same heavy, pressed steel frame and nine cross-members are retained, the same rugged type of construction is used throughout the entire chassis and body. At no point has there been any compromise with strength. Several new features have

The New Studebaker 75



—MORE POWER

and at Lower Cost

been incorporated. The engine has a high compression head; the generator is cooled with a centrifugal blower type fan; the specially designed rear axle is equipped with heavy bumper blocks which act as an auxiliary spring and bumper; the new double-face emergency brake operating on the propeller shaft is 14 inches in diameter.

The four-wheel mechanical brakes operate smoothly and easily, at 40 miles per hour to a full stop in 71 feet, or in 17 feet at 20 miles per hour. Notable ease of steering and a motor that is instantly responsive enables the driver to handle the Studebaker "75" high speed bus with the comfort and surety of a passenger car.

With these new features, less weight, greater power and lower cost, this new Studebaker "75" special high speed chassis offers a new conception of bus chassis value at $2775.

Mail this coupon for further particulars

THE STUDEBAKER CORPORATION
OF AMERICA
Dept. B, South Bend, Ind.

Please send me complete specifications of your "75" Special, without obligation.

We have.....busses at present. Check below the Studebaker Bus about which you desire information.

Chassis model.....Type: Sedan.....Parlor Car.....

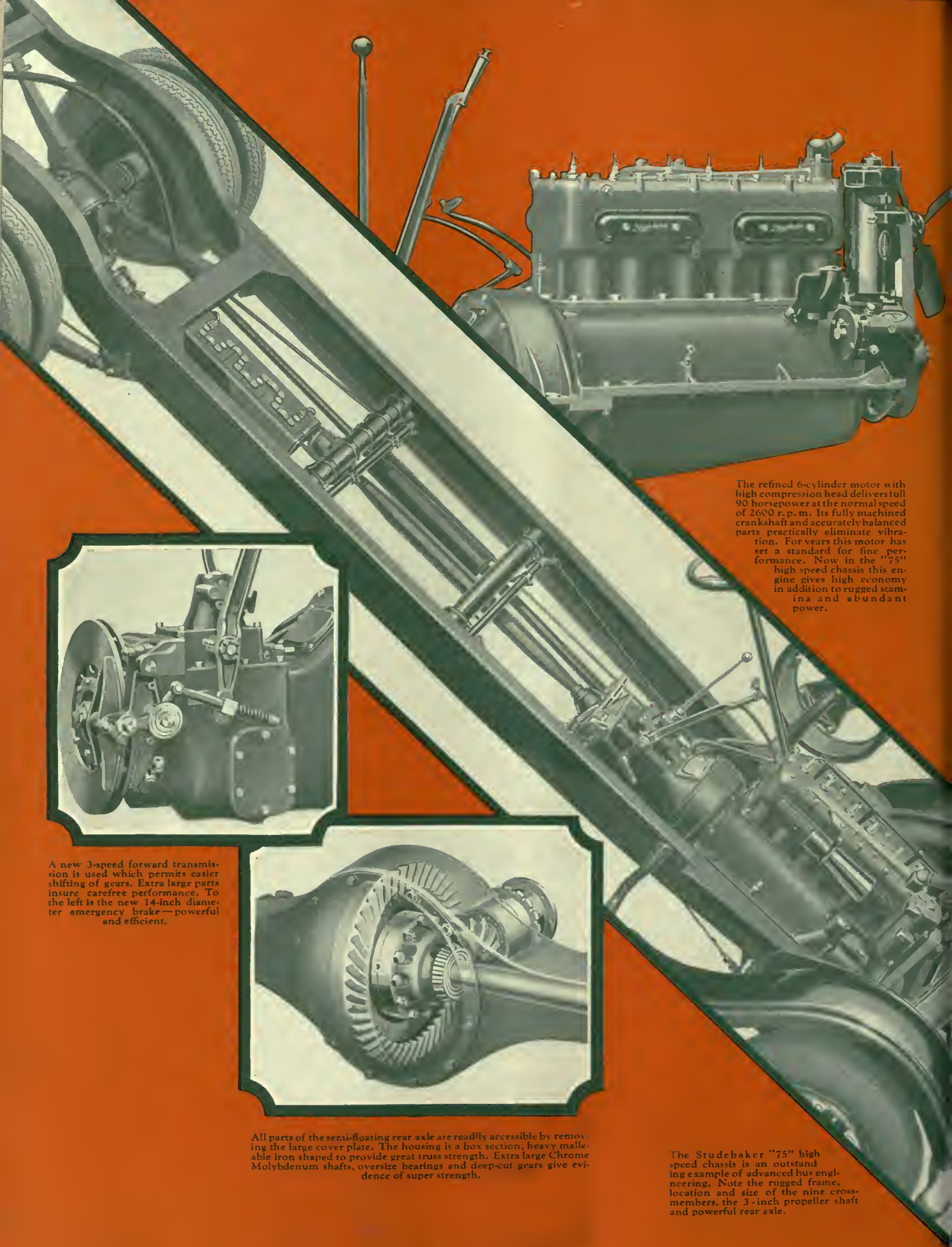
Street Car Type.....Capacity.....Passenger.

Name.....

Address.....

City.....State.....

High Speed Bus Chassis



The refined 6-cylinder motor with high compression head delivers full 90 horsepower at the normal speed of 2600 r.p.m. Its fully machined crankshaft and accurately balanced parts practically eliminate vibration. For years this motor has set a standard for fine performance. Now in the "75" high speed chassis this engine gives high economy in addition to rugged stamina and abundant power.

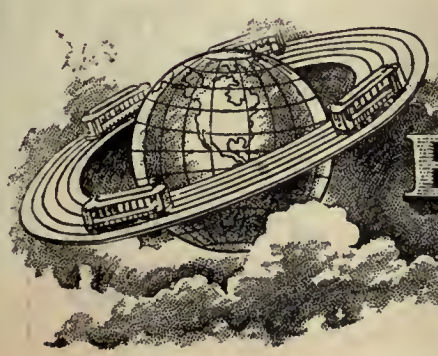
A new 3-speed forward transmission is used which permits easier shifting of gears. Extra large parts insure carefree performance. To the left is the new 14-inch diameter emergency brake—powerful and efficient.

All parts of the semi-floating rear axle are readily accessible by removing the large cover plate. The housing is a box section, heavy malleable iron shaped to provide great truss strength. Extra large Chrome Molybdenum shafts, oversize bearings and deep-cut gears give evidence of super strength.

The Studebaker "75" high speed chassis is an outstanding example of advanced bus engineering. Note the rugged frame, location and size of the nine cross-members, the 3-inch propeller shaft and powerful rear axle.

The New Studebaker (75) ~~*High Speed*~~ Bus Chassis

JUST as the electric railway companies have to compile and be guided by exhaustive statistics as to peak loads, traffic densities, costs per mile, and so forth, we must constantly keep ourselves informed as to purchasing power, density of population and all vital market information in order to maintain our service as an active asset of your service.



Barron G. Collier
INCORPORATED
CANDLER BLDG. NEW YORK

Bankers and Engineers

Ford, Bacon & Davis
Incorporated
Engineers
115 Broadway, New York
PHILADELPHIA CHICAGO SAN FRANCISCO

The J. G. White Engineering Corporation
Engineers—Constructors
Oil Refineries and Pipe Lines, Steam and Water Power Plants, Transmission Systems, Hotels, Apartments, Office and Industrial Buildings, Railroads.
43 Exchange Place New York

STONE & WEBSTER
Incorporated
Design and Construction
Examinations Reports Appraisals
Industrial and Public Service Properties
NEW YORK BOSTON CHICAGO

THE BEELER ORGANIZATION
Transportation, Traffic, Operating Surveys
Better Service—Financial Reports
Appraisals—Management
52 Vanderbilt Ave. New York

SANDERSON & PORTER
ENGINEERS
PUBLIC UTILITIES & INDUSTRIALS
Design Construction Management
Examinations Reports Valuations
CHICAGO NEW YORK SAN FRANCISCO

ENGELHARDT W. HOLST
Consulting Engineers
Appraisals Reports Rates Service Investigation
Studies on Financial and Physical Rehabilitation
Reorganization Operation Management
683 Atlantic Ave., BOSTON, MASS.

ALBERT S. RICHEY
ELECTRIC RAILWAY ENGINEER
WORCESTER, MASSACHUSETTS
REPORTS - APPRAISALS - RATES - OPERATION - SERVICE

J. ROWLAND BIBBINS
Engineer—2301 Connecticut Ave., N.W., Washington, D. C.
TRANSPORTATION SURVEYS
Organized Traffic Relief and Transit Development
Co-ordinating Motor Transport, Railroad and City Plans, Service, Routing, Valuation, Economic Studies
EXPERIENCE IN 20 CITIES

C. B. BUCHANAN, President — W. H. PRICE, JR., Sec'y-Treas. — JOHN F. LAYNG, Vice-President
BUCHANAN & LAYNG CORPORATION
Engineering and Management, Construction
Financial Reports, Traffic Surveys
and Equipment Maintenance
BALTIMORE 1004 Citizens National Bank Bldg. — Phone: Hanover: 2142 — NEW YORK 49 Wall Street

DAY & ZIMMERMANN, INC.
ENGINEERS
DESIGN - CONSTRUCTION - REPORTS
VALUATIONS - MANAGEMENT
NEW YORK PHILADELPHIA CHICAGO

HEMPHILL & WELLS
CONSULTING ENGINEERS
Gardner F. Wells Albert W. Hemphill
APPRAISALS
INVESTIGATIONS COVERING
Reorganization Management Operation Construction
43 Cedar Street, New York City

STEVENS & WOOD
INCORPORATED
ENGINEERS AND CONSTRUCTORS
120 BROADWAY, NEW YORK
ENGINEERING CONSTRUCTION — YOUNGSTOWN, O. — FINANCING MANAGEMENT

KELKER, DELEUW & CO.
CONSULTING ENGINEERS
REPORTS ON
Operating Problems Valuations Traffic Surveys
111 W. Washington Street, Chicago, Ill.

McCLELLAN & JUNKERSFELD
Incorporated
ENGINEERING AND CONSTRUCTION
Examinations—Reports—Valuations
Transportation Problems—Power Developments
68 Trinity Place, New York
Chicago St. Louis

E. H. FAILE & CO.
Designers of
Garages— Service Buildings—Terminals
441 LEXINGTON AVE. NEW YORK

WALTER JACKSON
Consultant on Fares and Motor Buses
The Weekly and Sunday Pass—Differential Fares—Ride Selling
Holbrook Hall 5-W-3
160 Gramatan Ave., Mt. Vernon, N. Y.

THE BABCOCK & WILCOX COMPANY

85 Liberty Street, New York

Builders since 1868 of Water Tube Boilers of continuing reliability

BRANCH OFFICES

Boston, 80 Federal Street
Philadelphia, Packard Building
Pittsburgh, Farmers Deposit Bank Building
Cleveland, Guardian Building
Chicago, Marquette Building
Cincinnati, Traction Building
Atlanta, Candler Building
Phoenix, Aris., Heard Building
Dallas, Tex., Magnolia Building
Honolulu, H. T., Castle & Cooke Building
Portland, Ore., Gasco Building

WORKS
Bayonne, N. J.
Barberton, Ohio

Makers of Steam Superheaters since 1898 and of Chain Grate Stokers since 1893

BRANCH OFFICES

Detroit, Ford Building
New Orleans, 344 Camp Street
Houston, Texas, Electric Building
Denver, 444 Seventeenth Street
Salt Lake City, Kearns Building
San Francisco, Sheldon Building
Los Angeles, Central Building
Seattle, L. C. Smith Building
Havana, Cuba, Calle de Aguiar 104
San Juan, Porto Rico, Royal Bank Building

THE P. EDWARD WISH SERVICE

50 Church St. NEW YORK — *Street Railway Inspection* DETECTIVES — 131 State St. BOSTON

TRAFFIC CONSULTANT

Freight Rate, Tariff and Traffic Analyses;
Advisory Freight Traffic Assistance on Special or Monthly Basis;
Preparation of Cases before Interstate Commerce Commission and State Commissions.

HALSEY McGOVERN
Mills Bldg., 17th and Pa. Ave., Washington, D. C.

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

Hale and Kilburn SEATS

Better Quality Seats For Cars and Buses

Hale-Kilburn Co.
1800 Lehigh Ave., Philadelphia, Pa.

RAIL GRINDERS AND WELDERS

Railway Track-work Co., Philadelphia

682

UNA

RAIL JOINTS
DYNAMOTORS
WELDING ROD
UNA Welding & Bonding Co.
Cleveland, Ohio.

Hubbard and COMPANY

PITTSBURGH OAKLAND CHICAGO

INDUSTRIAL GASES

ACETYLENE
OXYGEN
I.O.C. SYSTEM
HYDROGEN
NITROGEN

Quick shipment and low prices also on cylinders, valves, torches, regulators and supplies.

International Oxygen Co., Main Offices: Newark, N. J.
Branches: New York Pittsburgh Toledo

PS HEATERS

Car Heating and Ventilating

—are no longer operating problems. We can show you how to take care of both with one equipment. The Peter Smith Forced Ventilation Hot Air Heater will save, in addition, 40% to 60% of the cost of any other car heating and ventilating system. Write for details.

The Peter Smith Heater Company
6209 Hamilton Ave., Detroit, Mich.



Boyerized Parts:

Brake Pins
Brake Hangers
Brake Levers
Pedestal Oibs
Brake Fulcrums
Turnbuckles
Center Bearings
Side Bearings
Spring Post Bushings
Spring Posts
Bolster and Transom Chafing Plates
Manganese Brake Heads
Manganese Truck Parts
Bushings
Bronze Bearings
McArthur Turnbuckles

Can be purchased through the following representatives:

Economy Electric Devices Co.
72 W. Van Buren St., Chicago, Ill.
F. F. Bodler,
903 Monadnock Bldg., San Francisco, Cal.
W. F. McKenney,
54 First Street, Portland, Oregon.
J. H. Denton,
1328 Broadway, New York City, N. Y.
A. W. Arlin,
519 Delta Bldg., Los Angeles, Cal.

Bemis Car Truck Company
Springfield, Mass.

TULC

A LUBRICANT

We make a specialty of
ELECTRIC RAILWAY LUBRICATION
We solicit a test of TULC on your equipment
The Universal Lubricating Co.
Cleveland, Ohio
Chicago Representatives: Jameson-Ross Company, Straus Bldg.



MORE-JONES TROLLEY WHEELS AND HARPS

WE MANUFACTURE various types of trolley equipment. The quality of metal, conductivity, resistance to friction, effect on overhead, shape and size of wheel groove, have all been carefully worked out and perfected. In addition to the highly specialized V-K Oilless Trolley Wheels and Harps, More-Jones make the most complete line of lubricated trolley wheels and harps to meet all requirements. Let us quote you.

National Bearing Metals Corporation
St. Louis, Mo.

"MORE-JONES QUALITY PRODUCTS"



Structural Shapes · Steel Sheet Piling
Plates · Skelp
Bars and Bar Mill Products
Bands · Hoops
Axles · Wrought Steel Wheels
Rails · Rail Joints
Steel Cross Ties

CARNEGIE STEEL COMPANY
General Offices · Carnegie Building · 434 Fifth Avenue
PITTSBURGH PENNSYLVANIA

1839

Griffin Wheel Company
410 North Michigan Ave.
Chicago, Ill.

Griffin Wheels
with
Chilled Rims
and
Chilled Back of Flanges
For Street and Interurban Railways

FOUNDRIES:

Chicago	Boston	St. Paul
Detroit	Kansas City	Los Angeles
Denver	Council Bluffs	Tacoma
Cleveland	Salt Lake City	Cincinnati

In go the parts —off come the grease and dirt!



WHAT simpler way to clean dirty, grease-covered bus and car parts?

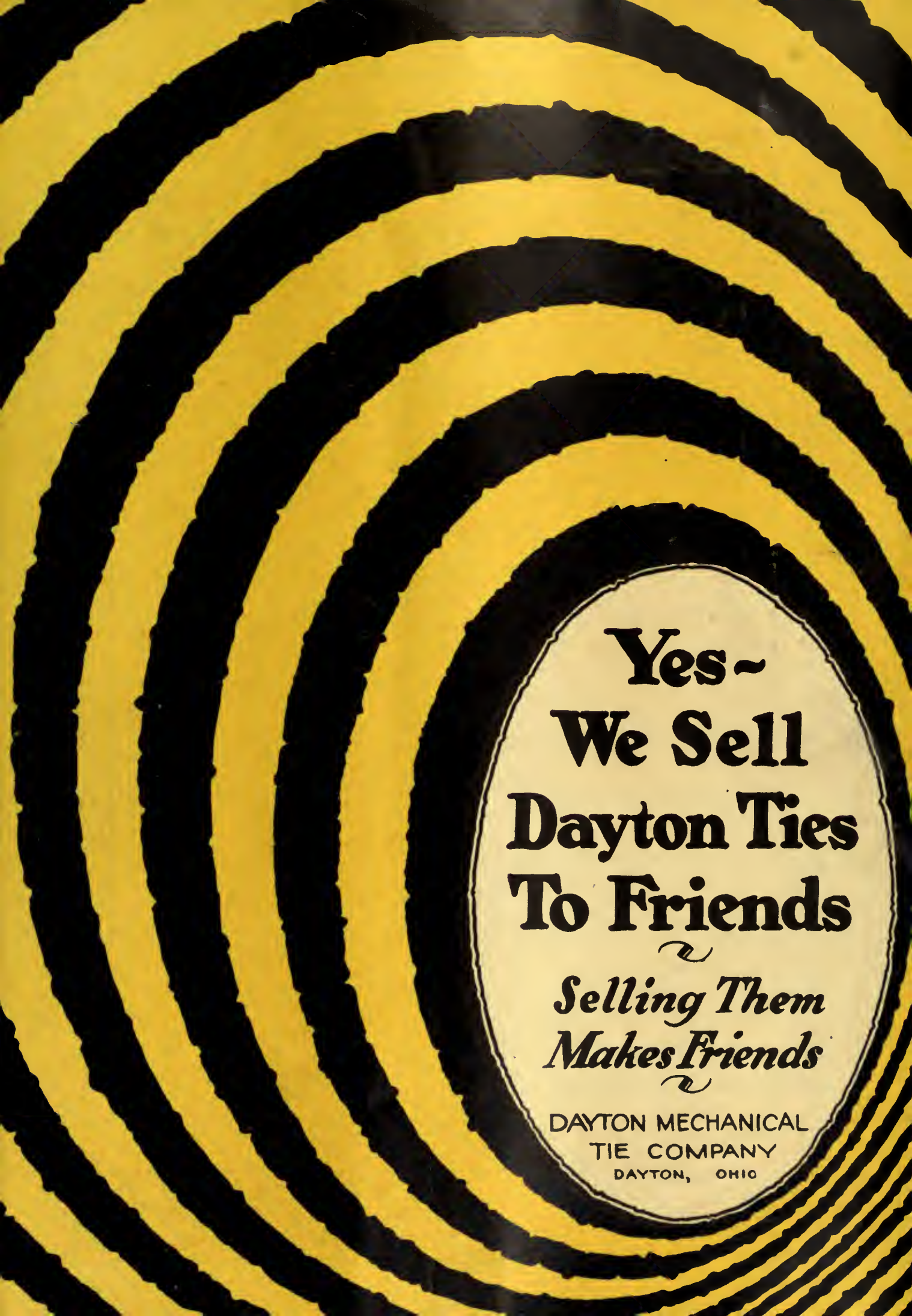
Tedious hand scrubbing practices are fast being discarded in favor of this better, easier Oakite method of *soaking* parts clean. With the result that considerable time and effort are saved; repair jobs are speeded up; maintenance costs lowered.

Test out Oakite cleaning materials in your own shops. Find out what these advantages will mean to you in actual dollars and cents savings. Drop us a card and our Service Man will call.

Oakite Service Men, cleaning specialists, are located in the leading industrial centers of the U. S. and Canada

Oakite is manufactured only by
OAKITE PRODUCTS, INC., 28B Thames St., NEW YORK, N. Y.

OAKITE
TRADE MARK REG U.S. PAT. OFF.
Industrial Cleaning Materials and Methods


Yes~
We Sell
Dayton Ties
To Friends
Selling Them
Makes Friends
DAYTON MECHANICAL
TIE COMPANY
DAYTON, OHIO

Yes—We Sell Dayton Ties to Friends

Because Selling Them Makes Friends, Our Repeat Orders Show It

We don't sell Dayton Ties to people because they are our friends—our customers are friends because we sell them Dayton Ties.

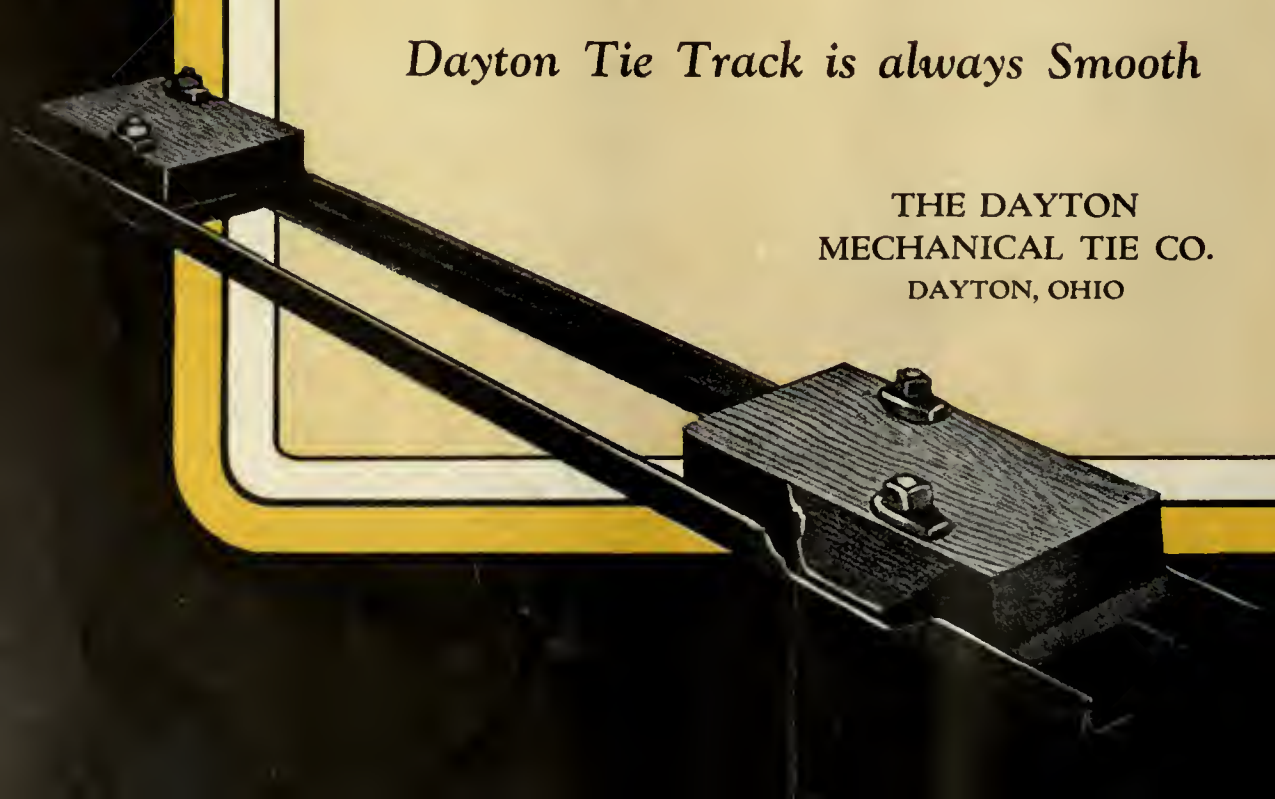
When electric railway officials get hold of something like Dayton Ties, which practically wipe out track maintenance they are naturally friendly—you can't blame them.

Dayton Ties do not merely obliterate track maintenance for a year or two, but for astonishing periods of years. Since their inception 16 years ago no track laid on Dayton Ties has ever failed.

Installations in 150 cities, under every kind of traffic the industry has to offer, meeting all kinds of adverse conditions—and not a failure. They continue to order—time after time.

Once you try Dayton Ties, you will be a friend, too.

Dayton Tie Track is always Smooth



THE DAYTON
MECHANICAL TIE CO.
DAYTON, OHIO

COLUMBIA

Railway Supplies and Equipment

Machine and
Sheet Metal Work

Forgings
Special Machinery
and Patterns

Grey Iron and
Brass Castings

Armature and
Field Coils.

The Columbia Machine Works *and M. I. Co.*
265 Chestnut St., corner Atlantic Ave.,
Brooklyn, New York



JOHNSON FARE COLLECTING SYSTEMS

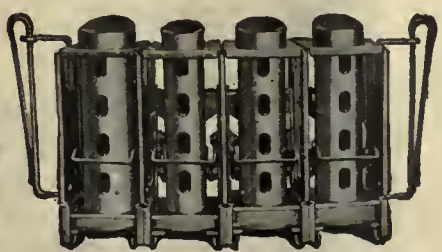


Johnson Electric Fare Boxes and overhead registers make possible the instantaneous registering and counting of every fare. Revenues are increased 1½ to 5% and the efficiency of one-man operation is materially increased. Over 4000 already in use.

When more than two coins are used as fare, the Type D Johnson Fare Box is the best manually operated registration system. Over 50,000 in use.

Johnson Change-Makers are designed to function with odd fare and metal tickets selling at fractional rates It is possible to use each barrel separately or in groups to meet local conditions. Each barrel can be adjusted to eject from one to five coins or one to six tickets.





Johnson Fare Box Co.
4619 Ravenswood Ave., Chicago, Ill.



Nuttall US 20-A Timken Roller Bearing Trolley Base

Grease 'er Twice a Year And Let 'er Go

You have smiled for years at the original feller in Coatesville who tells you to "Hook 'er to the Biler"—that's *amusement.*

But if you want to wear the smile of *genuine satisfaction*, and see that smile on every conductor's face—on every face around the car barn, here's a sure fire prescription:

Put on some Nuttall US 20-A Trolleys. It is literally true that you can lubricate them twice a year and forget them. They swivel on Timken Tapered Roller Bearings, and you know what they are. Every wearing part is hardened, and you can forget wear. Heavy shunts conduct the current around bearings and moving parts, so you can forget arcing troubles. All in all, what could be sweeter?

MEMBER AERA 1927

R.D. NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railway and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.

TISCO
MANGANESE STEEL
SPECIAL TRACKWORK

Wharton *Tisco* Manganese Steel Trackwork will help you hold the up-keep down.

WM. WHARTON JR. & CO., INC.
Easton, Penna.

B. A. HEGEMAN, Jr., President — H. A. HEGEMAN, First Vice-Pres. and Treas.
F. T. SARGENT, Secretary — W. C. PETERS, Vice-Pres. Sales and Engineering

National Railway Appliance Co.
Graybar Building, 420 Lexington Ave., New York

BRANCH OFFICES
Munsey Bldg., Washington, D. C. — 100 Boylston St., Boston, Mass.
Hegeman-Castle Corporation, Railway Exchange Building, Chicago, Ill.

RAILWAY SUPPLIES

Tool Steel Gears and Pinions
Anglo-American Varnish Co., Varnishes, Enamels, etc.
National Hand Holds
Genesco Paint Oils
Dunham Hopper Door Device
Garland Ventilators
Walter Tractor Snow Plows
Feasible Drop Brake Staffs
Ft. Pitt Spring & Mfg. Co., Springs
Flaxlinum Insulation
Economy Electric Devices Co. Power Saving and Inspection Meters
National Safety Devices Company's Whistle Blowers, Gong Ringers and Brake Hangers
Godward Gas Generators
Cowdry Automotive Brake Testing Machine

THE WORLD'S STANDARD
"IRVINGTON"
Black Varnished Silk, and Varnished Cambric, Yellow Varnished Paper
Irv-O-Slot Insulation
Flexible Varnished Tubing
Insulating Varnishes and Compounds

Irvington Varnish & Insulator Co.
Irvington, N. J.

Sales Representatives:

Mitchell-Rand Mfg. Co., N. Y.
E. M. Wolcott, Rochester
I. W. Levine, Montreal
A. L. Gillies, Toronto
Prehler Brothers Inc., Chicago
White Supply Co., St. Louis
Clapp & LaMorse, Los Angeles
Martin Woodard, Seattle
Consumers' Rubber Co., Cleveland

Lorain Special Trackwork
Girder Rails

Electrically Welded Joints

THE LORAIN STEEL COMPANY
Johnstown, Pa.
Sales Offices:
Atlanta, Chicago, Cleveland, New York, Philadelphia, Pittsburgh, Dallas
Pacific Coast Representative:
United States Steel Products Company
Los Angeles, Portland, San Francisco, Seattle
Export Representative:
United States Steel Products Company, New York, N. Y.

Kalamazoo Trolley Wheels

The value of Kalamazoo Trolley Wheels and Harps has been demonstrated by large and small electric railway systems for a period of thirty years. Being exclusive manufacturers, with no other lines to maintain, it is through the high quality of our product that we merit the large patronage we now enjoy. With the assurance that you pay no premium for quality we will appreciate your inquiries.



THE STAR BRASS WORKS
KALAMAZOO, MICH., U. S. A.

Bethlehem Products for
Electric Railways

Tee and Girder Rails; Machine Fitted Joints; Splice Bars; Hard Center Frogs; Hard Center Mates; Rolled Alloy Steel Crossings; Abbott and Center Rib Base Plates; Rolled Steel Wheels and Forged Axles; Tie Rods; Bolts; Tie Plates and Pole Line Material.

Catalog Sent on Request

BETHLEHEM STEEL COMPANY, Bethlehem, Pa.

BETHLEHEM

Atlanta
Baltimore
Boston
Buffalo
Chicago
Cincinnati
Cleveland
Dallas
Detroit
Indianapolis
Kansas City
Los Angeles
Milwaukee
Minneapolis
New Orleans
New York
Philadelphia
Pittsburgh
San Francisco
St. Louis
Syracuse
Seattle
Washington, D. C.
Berlin, Germany

Investigations • Reports
Valuations

The American Appraisal Company

A National Organization



FARE
BOXES for BUSES

Let us tell you of this especially designed box for this class of service.

The Cleveland Fare Box Co.
4900 Lexington Ave., Cleveland, O.
Canadian Cleveland Fare Box Co., Ltd.
Preston, Ontario

COIN COUNTING And Sorting Machines CHANGE CARRIERS Tokens

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.

Positions Vacant and all other classifications, 3 cents a word, minimum charge $2.00.

Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.

Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

1 to 3 inches.....$4.50 an inch
4 to 7 inches..... 4.30 an inch
8 to 14 inches..... 4.10 an inch

Rates for larger spaces, or yearly rates, on request.

An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

POSITIONS WANTED

EXECUTIVE — Fifteen years' experience managing light, power and transportation properties. Open for other connections; personal reasons for desiring change. PW-69, Electric Railway Journal, Guardian Bldg., Cleveland, Ohio.

GENERAL superintendent or manager; fifteen years' successful experience. PW-55, Electric Railway Journal, Tenth Ave. at 36th St., New York.

SUPERINTENDENT, fifteen years' experience in city, interurban and bus transportation in foreign countries and United States; can speak Spanish. PW-68, Electric Railway Journal, Tenth Avenue at 36th St., New York.

SUPERINTENDENT equipment, M. M. efficiency; work unit cost production appointment wanted; highest personal references; 25 years' experience steam electric, stores; wide bus experience in London and U. S. A. and public relations; willing to go anywhere. PW-70, Electric Railway Journal, Tenth Ave. at 36th St., New York.

SUPERINTENDENT of transportation, ten years' experience in high speed interurban and city operation, desires position in the South. Best of references. PW-72, Electric Railway Journal, Tenth Ave. at 36th St., New York.

While they last

BIRNEY CARS

Deferred payment plan—Pay out of earnings. Will exchange for your old equipment

29—OVERHAULED NEWLY PAINTED, complete and ready to run, Whs-508 Motors, K-63 Controllers, Brill 79-E Trucks, DH-16 Compressors. Price each..... $1500
F.O.B. Cars New York City

23—Good operating condition, complete and ready to run, GE-258 Motors, K-63 Controllers, Brill 79-E Trucks, CP-27 Compressors. Price each..... 1000
F.O.B. Cars New York City

11—Good operating condition, complete and ready to run, GE-264 Motors, K-63 Controllers, Brill 79-E Trucks, CP-27 Compressors. Price each..... 1500
F.O.B. Cars New York City

Extra Motors, Trucks, Compressors, Controllers, etc.

Transit Equipment Company

Cars—Motors

501 Fifth Avenue, New York

WANTED

MOTOR

1—Westinghouse 68 or 68C Motor, railway type, 500 volts. Will consider armature. Only quote price and point of delivery.

W-73, Electric Railway Journal
883 Mission St., San Francisco, Cal.

FOR SALE

Following Peter Smith Heaters in good operating condition:

35—No. 2 Smith Heaters.
16—Type "A" Smith Heaters.
6—Type "C" Smith Heaters.
1—Type "CC-2" Smith Heaters.

The Milwaukee Electric Ry. & Lt. Co.,
Public Service Building, Milwaukee, Wisc.

FOR SALE

15 BIRNEY SAFETY CARS

Brill Built
West, 508 or G. E. 264 Motors
Cars Complete—Low Price—Fine Condition

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

We buy entire Railways and Power Plants

H. E. SALZBERG COMPANY, Inc.
225 Broadway New York City

We sell Street Railway and Power equipment

Don't Say, "*It isn't worth anything*"

THAT surplus Used Equipment you have lying around the shop or yard can be turned into cash! The fact that it is of no further value to you doesn't mean it isn't of value to somebody else. There's always a market for used equipment. Reach the greatest number of prospective buyers for the surplus equipment you have, at a minimum cost, thru an advertisement in the—

SEARCHLIGHT SECTION

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Brakes
General Electric Co.
Westinghouse Air Brake Co.

Anchors, Guy
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Appraisals
American Appraisal Co.

Armature Shop Tools
Columbia Machine Works
Elec. Service Supplies Co.

Automatic Return Switch Stands
Ramapo Ajax Corp.

Automatic Safety Switch Stands
Ramapo Ajax Corp.

Axles
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Cincinnati Car Co.
St. Louis Car Co.
Standard Steel Works
Westinghouse E. & M. Co.

Babbitting Devices
Columbia Machine Works & M. I. Co.

Babbit Metal
National Bearing Metals Corp.

Badges and Buttons
Elec. Service Supplies Co.
International Register Co.

Batteries, Dry
Nichols-Lintern Co.

Bearings and Bearing Metals
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
National Bearing Metal Corp.
St. Louis Car Co.
Westinghouse E. & M. Co.

Bearings, Center and Roller Side
Cincinnati Car Co.
Columbia Machine Works
Stucki Co., A.

Bells and Buzzers
Consolidated Car Heating Co.

Bells and Gongs
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
St. Louis Car Co.

Benders, Rail
Railway Trackwork Co.

Body Material, Haskelite Plymetl
Haskelite Mfg. Corp.

Bodies, Bus
Brill Co., The J. G.
Cummings Car & Coach Co.
St. Louis Car Co.

Boilers
Babcock & Wilcox Co.

Bond Testers
American Steel & Wire Co.
Electric Service Supplies Co.

Bonding Apparatus
American Steel & Wire Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.

Bonds, Rail
American Steel & Wire Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, etc.)
Bates Expanded Steel Truss Co.
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Brill Co., The J. G
Cincinnati Car Co.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
Bemis Car Truck Co.
Brill Co., The J. G.
St. Louis Car Co.
Taylor Electric Truck Co.

Brake Testers
National Ry. Appliance Co.

Brakes, Brake Systems and Brake Parts
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
General Electric Co.
National Brake Co.
Safety Car Devices Co.
St. Louis Car Co.
Westinghouse Tr. Br. Co.

Brakes, Magnetic Rail
Cincinnati Car Co.

Brushes, Carbon
General Electric Co
Westinghouse E. & M. Co.

Brushholders
Columbia Machine Works
General Electric Co.

Bulkheads
Haskelite Mfg. Corp.

Bunkers, Coal
American Bridge Co.

Buses
Cummings Car & Coach Co.
General Electric Co.
Studebaker Corp. of America
Twin Coach Corp.
Yellow Truck & Coach Co.

Bus Lighting
National Ry. Appliance Co.

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works
St. Louis Car Co.

Cables (See Wires and Cables)

Cambric Tapes, Yellow and Black Varnish
General Electric Co.
Irvington Varnish & Ins. Co.

Carbon Brushes (See Brushes, Carbon)

Car Lighting Fixtures
Elec. Service Supplies Co.

Car Panel Safety Switches
Consolidated Car Heating Co.
Westinghouse E. & M. Co.

Car Steps, Safety
Cincinnati Car Co.

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Cars, Dump
Brill Co., The J. G.
Differential Steel Car Co.
St. Louis Car Co.

Cars, Gas-Electric
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co.

Cars, Gas, Rail
Brill Co., The J. G.
St. Louis Car Co.

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Cincinnati Car Co.
Cummings Car & Coach Co.
Kuhlman Car Co., G. O.
St. Louis Car Co.
Thomas Car Works, Perley A.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Cars, Self-Propelled
Brill Co., The J. G.

Castings, Brass Composition or Copper
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
National Bearing Metals Corp.

Castings, Gray Iron and Steel
American Bridge Co.
Bemis Car Truck Co.
Columbia Machine Works & M. I. Co.
St. Louis Car Co.
Standard Steel Works

Castings, Malleable & Brass
Bemis Car Truck Co.
Columbia Machine Works & M. I. Co.
St. Louis Car Co.

Catchers and Retrievers, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.

Ceiling Car
Haskelite Mfg. Corp.

Ceilings Plywood Panels
Haskelite Mfg. Corp.

Change Carriers
Cleveland Fare Box Co.
Electric Service Supplies Co.

Change Trays
Cincinnati Car Co.

Circuit-Breakers
General Electric Co.
Westinghouse E. & M. Co.

Clamps and Connectors for Wires and Cables
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Cleaners
Oakite Products, Inc.

Cleaners and Scrapers Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
Long Mfg. Co.

Coil Banding and Winding Machines
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

Coils, Armature and Field
Columbia Machine Works & M. I. Co.
General Electric Co.
Westinghouse E. & M. Co.

Coils, Choke and Kicking
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E & M. Co.

Coin Changers
Johnson Fare Box Co.

Coin Counting Machines
Cleveland Fare Box Co.
International Register Co.
Johnson Fare Box Co.

Coin Sorting Machines
Cleveland Fare Box Co.
Johnson Fare Box Co.

Coin Wrappers
Cleveland Fare Box Co.

Commutator Slotters
Columbia Machine Works
Elec. Service Supplies Co.
Westinghouse E. & M. Co.
Wood Co., Chas. N.

Commutators or Parts
Columbia Machine Works & M. I. Co.
General Electric Co.
Westinghouse E. & M. Co.

Compressors, Air
General Electric Co.
Westinghouse Tr. Br. Co.

Condensers
General Electric Co.
Westinghouse E. & M. Co.

Condensor Papers
Irvington Varnish & Ins. Co.

Connectors, Solderless
Westinghouse E. & M. Co.

Connectors, Trailer Car
Columbia Machine Works
Consolidated Car Heating Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Controllers or Parts
Columbia Machine Works & M. I. Co.
General Electric Co.
Westinghouse E. & M. Co.

Controller Regulators
Elec. Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse E. & M. Co.

Converters, Rotary
General Electric Co.
Westinghouse E. & M. Co.

Copper Wire
American Brass Co.
American Steel & Wire Co.
Anaconda Copper Mining Co

Copper Wire Instruments, Measuring, Testing and Recording
American Brass Co.
Anaconda Copper Mining Co.

Cord, Bell, Trolley, Register
American Steel & Wire Co.
Brill Co., The J. G.
Elec. Service Supplies Co.
International Register Co.
Roebling's Sons Co., John A.
St. Louis Car Co.
Samson Cordage Works

Cord Connectors and Couplers
Elec. Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
Ohio Brass Co.
Westinghouse Traction Brake Co.

Cowl Ventilators
Nichols-Lintern Co.

Cranes, Hoists & Lifts
Electric Service Supplies Co.

Cross Arms (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossings
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Frogs & Switches
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Track (See Track Special Work)

Crossings, Trolley
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Culverts
Central Alloy Steel Corp.

Curtains & Curtain Fixtures
Brill Co., The J. G.
St. Louis Car Co.

Cutting Apparatus
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse Electrical & Mfg. Co.

Dealer's Machinery & Second Hand Equipment
Electric Equipment Co.
Salzberg, Inc., H. E.

Derailing Devices (See also Track Work)

Derailing Switches
Ramapo Ajax Corp.

Destination Signs
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.

Detective Service
Wish-Service, P. Edward

Door Operating Devices
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Heating Co.
National Pneumatic Co.
Safety Car Devices Co.

Doors & Door Fixtures
Brill Co., The J. G.
Cincinnati Car Co.
Hale-Kilburn Co.
St. Louis Car Co.

Doors, Folding Vestibule
National Pneumatic Co.
Safety Car Devices Co.

Drills, Track
American Steel & Wire Co.
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Dryers, Sand
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Ears
Columbia Machine Works & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Electric Grinders
Railway Trackwork Co.

Electric Rivet Heaters
American Car & Fdry. Co.

Electrical Wires and Cables
Amer. Electrical Works.
American Steel & Wire Co.
John A. Roebling's Sons Co.

Electrodes, Carbon
Railway Trackwork Co.
Una Welding & Bonding Co.

Electrodes, Steel
Railway Trackwork Co.
Una Welding & Bonding Co.

Engineers, Consulting, Contracting and Operating
Beeler, John A.
Bibbins, J. Rowland
Day & Zimmermann, Inc.
Falle & Co., E. H.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & DeLeuw
McClellan & Junkersfeld
McGovern, Halsey
Richey, Albert S.
Sanderson & Porter
Stevens & Wood
Stone & Webster Co.
White Eng. Corp., The J. G.

Engines, Gas, Oil or Steam
Westinghouse E. & M. Co.

Exterior Side Panels
Haskelite Mfg. Corp.

Fare Boxes
Cleveland Fare Box Co.
Johnson Fare Box Co.
Perey Mfg. Co.

Fare Registers
Electric Service Supplies Co.
Johnson Fare Box Co.

Fences, Woven Wire & Fence Posts
American Steel & Wire Co.

Fenders and Wheel Guards
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Fender Co.
St. Louis Car Co.
Star Brass Works
Wood Co., Chas. N.

Fibre and Fibre Tubing
Westinghouse E. & M. Co.

Field Coils (See Coils)

Floodlights
Electric Service Supplies Co.
General Electric Co.

Floor, Sub
Haskelite Mfg. Corp.

Floors
Haskelite Mfg. Corp.

Forgings
Brill Co., The J. G.
Cincinnati Car Co.
Standard Steel Works

Frogs & Crossings, Tee Rail
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Frogs, Track (See Track Work)

Frogs, Trolley
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Fuses and Fuse Boxes
Columbia Machine Works & M. I. Co.
Consolidated Car Heating Co.
General Electric Co.
Westinghouse E. & M. Co.

Gas Electric Drive for Buses
General Electric Co.

Gaskets
Westinghouse Tr. Br. Co.

(Continued on page 40)

Arc Weld Rail Bonds

AND ALL OTHER TYPES

Descriptive Catalogue Furnished

American Steel & Wire Company

New York Chicago Boston Cleveland Pittsburgh Denver

U. S. Steel Products Co

San Francisco Los Angeles Portland Seattle

"The Standard for Rubber Insulation"

INSULATED WIRES and CABLES

"Okonite," "Manson," and Dundee "A" "B" Tapes

Send for Handbook

The Okonite Company

The Okonite-Callender Cable Company, Inc.

Factories, PASSAIC, N. J. PATERSON, N. J.

Sales Offices: New York Chicago Pittsburgh St. Louis Atlanta Birmingham San Francisco Los Angeles Seattle

Pettingell-Andrews Co., Boston, Mass.

F. D. Lawrence Electric Co., Cincinnati, O.

Novelty Electric Co., Phila., Pa.

Can. Rep.: Engineering Materials Limited, Montreal.

Cuban Rep.: Victor G. Mendoza Co., Havana.

NORTHERN BELL WESTERN

CEDAR POLES

BUTT TREATING ALL GRADES TIES

BELL LUMBER CO., *Minneapolis, Minn.*

ELRECO TUBULAR POLES



COMBINE

Lowest Cost Lightest Weight

Least Maintenance Greatest Adaptability

Catalog complete with engineering data sent on request.

ELECTRIC RAILWAY EQUIPMENT CO.

CINCINNATI, OHIO

New York City, 30 Church Street

ANACONDA from mine to consumer

Rod, Wire and Cable Products

ANACONDA COPPER MINING COMPANY

THE AMERICAN BRASS COMPANY

General Offices - - 25 Broadway, New York

ANACONDA TROLLEY WIRE

Efficient Bus Heating

with

The N-L Venti-Duct Heater

THE NICHOLS-LINTERN CO.

7960 Lorain Ave. Cleveland, Ohio

AMELECTRIC PRODUCTS

BARE COPPER WIRE AND CABLE

TROLLEY WIRE

WEATHERPROOF WIRE AND CABLE

PAPER INSULATED UNDERGROUND CABLE

MAGNET WIRE

Beg. U. S. Pat. Office

AMERICAN ELECTRICAL WORKS

PHILLIPSDALE, R. I.

Chicago, 20-32 West Randolph Street.
Cincinnati, Traction Bldg.: New York, 100 E. 42nd St.

NAUGLE POLES

WESTERN & NORTHERN CEDAR

NAUGLE POLE & TIE CO.

59 E. MADISON ST. CHICAGO ILL.

New York · Columbus · Kansas City · Spokane · Vancouver · Boston

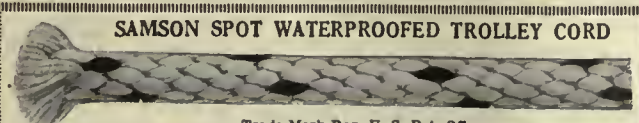
Repetition is Reputation

ELECTRICAL WIRES and CABLES

ROEBLING

John A. Roebling's Sons Co., Trenton, N. J.

SAMSON SPOT WATERPROOFED TROLLEY CORD



Trade Mark Reg. U. S. Pat. Off.

Made of extra quality stock firmly braided and smoothly finished
Carefully inspected and guaranteed free from flaws.
Samples and information gladly sent.

SAMSON CORDAGE WORKS, BOSTON, MASS.



Gets Every Fare

PEREY TURNSTILES or PASSIMETERS

Use them in your Prepayment Areas and Street Cars

Perey Manufacturing Co., Inc.

101 Park Avenue, New York City

Gas Producers
Westinghouse E. & M. Co.

Gates, Car
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.

Gear Blanks
Brill Co., The J. G.
Standard Steel Works

Gear Cases
Chillingworth Mfg. Co.
Columbia Machine Works & M. I. Co.
Electric Service Supplies Co
Westinghouse E. & M. Co.

Gears and Pinions
Bemis Car Truck Co.
Columbia Machine Works & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Nat'l Ry. Appliance Co.
R. D. Nuttall Co.
Tool Steel Gear & Pinion Co.

Generators
General Electric Co.
Westinghouse E. & M. Co.

Girder Rails
Bethlehem Steel Co.
Lorain Steel Co.

Gongs (See Bells and Gongs)

Greases (See Lubricants)

Grinders, Portable
Railway Trackwork Co.

Grinders, Portable Electric
Railway Trackwork Co.

Grinding Bricks and Wheels
Railway Trackwork Co.

Guard Rail Clamps
Ramapo Ajax Corp.

Guard Rails, Tee Rail & Manganese
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Guards, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.

Harps, Trolley
Columbia Machine Works
Elec. Service Supplies Co.
National Bearing Metals Corp.
R. D. Nuttall Co.
Star Brass Works

Headlights
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

Headlining
Columbia Machine Works & M. I. Co.
Haskelite Mfg. Corp.

Heaters, Bus
Nichols-Lintern Co.

Heaters, Car (Electric)
Consolidated Car Heating Co.
Gold Car Heat. & Ltg. Co.
Railway Utility Co.
Smith Heater Co., Peter

Heaters, Car, Hot Air and Water
Smith Heater Co., Peter

Heaters, Car Stove
Smith Heater Co., Peter

Heaters, Electric Rivet
American Car & Fdry. Co.

Helmets, Welding
Railway Trackwork Co.
Una Welding & Bonding Co.

Hoists & Lifts
Columbia Machine Works & M. I. Co.

Hose, Bridges
Ohio Brass Co.

Hose, Pneumatic
Westinghouse Traction Brake Co.

Instruments, Measuring, Testing and Recording
American Steel & Wire Co.
General Electric Co.
National Ry. Appliance Co.
Westinghouse E. & M. Co.

Insulating Cloth, Paper and Tape
General Electric Co.
Irvington Varnish & Ins. Co.
Okonite Co.
Okonite-Callender Cable Co.
Westinghouse E. & M. Co.

Insulating Silk
Irvington Varnish & Ins. Co.

Insulating Varnishes
Irvington Varnish & Ins. Co.

Insulation (See also Paints)
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
Irvington Varnish & Ins. Co.
Okonite Co.
Okonite-Callender Cable Co.
Westinghouse E. & M. Co.

Insulation Slots
Irvington Varnish & Ins. Co.

Insulator Pins
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Insulators (See also Line Materials)
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Interior Side Linings
Haskelite Mfg. Corp.

Jacks (See also Cranes, Hoists and Lifts)
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.

Joints, Rail
(See Rail Joints)

Journal Boxes
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.

Lamp Guards and Fixtures
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

Lamps, Arc & Incandescent (See also Headlights)
General Electric Co.
Westinghouse E. & M. Co.

Lamps, Signal and Marker
Elec. Service Supplies Co.
Nichols-Lintern Co.

Lanterns, Classification
Nichols-Lintern Co.

Letter Boards
Cincinnati Car Co.
Haskelite Mfg. Corp.

Lighting Fixtures, Interior
Electric Service Supplies Co.

Lightning Protection
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Line Material (See also Brackets, Insulators, Wires, etc.)
Archbold-Brady Co.
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
National Bearing Metals Corp.
Ohio Brass Co.
Westinghouse E. & M. Co.

Locking Spring Boxes
Wm. Wharton, Jr. & Co.

Locomotives, Electric
Cincinnati Car Co.
Cummings Car & Coach Co.
General Electric Co.
St. Louis Car Co.
Westinghouse E. & M. Co.

Lubricating Engineers
Universal Lubricating Co.

Lubricants, Oil and Grease
Universal Lubricating Co.

Manganese Parts
Bemis Car Truck Co.

Manganese Steel Guard Rails
Ramapo Ajax Corp.
Wm. Wharton Jr. & Co.

Manganese Steel, Special Track Work
Bethlehem Steel Co.
Wm. Wharton, Jr. & Co.

Manganese Steel Switches, Frogs and Crossings
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Meters (See Instruments)

Mirrors, Inside & Outside
Cincinnati Car Co.

Motor Buses (See Buses)

Motors, Electric
General Electric Co.
Westinghouse E. & M. Co.

Motor, Generators & Controls for Electric Buses
General Electric Co.

Motorman's Seats
Brill Co., The J. G.
Cincinnati Car Co.
Elec. Service Supplies Co.
St. Louis Car Co.
Wood Co., Chas. N.

Nuts and Bolts
Bemis Car Truck Co.
Cincinnati Car Co.
Hubbard & Co.

Oils (See Lubricants)

Omnibuses (See Buses)

Oxy-Acetylene (See Cutting Apparatus)

Oxygen
International Oxygen Co.

Packing
Westinghouse Traction Brake Co.

Paints and Varnishes (Insulating)
Elec. Service Supplies Co.
Irvington Varnish & Ins. Co.

Paints & Varnishes, Railway
National Ry. Appliance Co.

Panels, Outside, Inside
Haskelite Mfg. Corp.

Pickup, Trolley Wire
Elec. Service Supplies Co.
Ohio Brass Co.

Pinion Pullers
Elec. Service Supplies Co.
Wood Co., Chas. N.

Pinions (See Gears)

Pins, Case Hardened, Wood and Iron
Ohio Brass Co.
Westinghouse Traction Brake Co.

Pipe Fittings
Standard Steel Works
Westinghouse Tr. Brake Co.

Planers (See Machine Tools)

Plates for Tee Rail Switches
Ramapo Ajax Corp.

Pliers, Rubber Insulated
Elec. Service Supplies Co.

Plywood Roofs, Headlinings, Floors, Interior Panels, Bulkheads, Truss Planks
Haskelite Mfg. Corp.

Pole Line Hardware
Bethlehem Steel Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.

Pole Reinforcing
Hubbard & Co.

Poles, Metal Street
Bates Expanded Steel Truss Co.
Elec. Ry. Equipment Co.
Hubbard & Co.

Poles, Ties, Posts, Piling & Lumber
Bell Lumber Co.
International Creosoting Co.
Naugle Pole & Tie Co.
J. F. Prettyman & Son

Poles and Ties, Treated
Bell Lumber Co.
International Creosoting Co.
J. F. Prettyman & Son

Poles, Trolley
Elec. Service Supplies Co.
R. D. Nuttall Co.

Poles, Tubular Steel
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.

Portable Grinders
Railway Trackwork Co.

Potheads
Okonite Co.
Okonite-Callender Cable Co., Inc.

Power Saving Devices
National Ry. Appliance Co.

Pressings, Special Steel
Cincinnati Car Co.

Pressure Regulators
General Electric Co.
Westinghouse E. & M. Co.
Westinghouse Traction Brake Co.

Punches, Ticket
International Register Co.
Wood Co., Chas. N.

Rail Braces and Fastenings
Ramapo Ajax Corp.

Rail Grinders (See Grinders)

Rail Joints
Carnegie Steel Co.
Rail Joint Co.

Rail Joints, Welded
Lorain Steel Co.

Rail Welding
Railway Trackwork Co.
Una Welding & Bonding Co.

Rails, Steel
Carnegie Steel Co.

Railway Safety Switches
Consolidated Car Heating Co.
Westinghouse E. & M. Co.

Rattan
Brill Co., The J. G.
Cummings Car & Coach Co.
Elec. Service Supplies Co.
Hale-Kilburn Co.
St. Louis Car Co.

Registers and Fittings
Brill Co., The J. G.
Cincinnati Car Co.
Elec. Service Supplies Co.
International Register Co.
St. Louis Car Co.

Reinforcement, Concrete
American Steel & Wire Co.
Bethlehem Steel Co.
Carnegie Steel Co.

Repair Shop Appliances (See also Coil Banding and Winding Machines)
Elec. Service Supplies Co.

Repair Work (See also Coils)
Westinghouse E. & M. Co.

Replacers, Car
Cincinnati Car Co.
Elec. Service Supplies Co.

Resistances
Consolidated Car Heating Co.
General Electric Co.

Resistance, Wire and Tube
Westinghouse E. & M. Co.

Retrievers, Trolley (See Catchers and Retrievers Trolley)

Rheostats
General Electric Co.
Westinghouse E. & M. Co.

Rivet Heaters, Electric
American Car & Fdry. Co.

Roofing, Car
Haskelite Mfg. Corp.

Roofs, Car and Bus
Haskelite Mfg. Corp.

Safety Control Devices
Safety Car Devices Co.

Sanders, Track
Brill Co., The J. G.
Elec. Service Supplies Co.
Nichols-Lintern Co.
Ohio Brass Co.
St. Louis Car Co.

Sash Fixtures, Car
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.

Sash, Metal Car Window
Hale-Kilburn Co.

Scrapers, Track (See Cleaners and Scrapers, Track)

Screw Drivers, Rubber Insulated
Elec. Service Supplies Co.

Seating Materials
Brill Co., The J. G.
Haskelite Mfg. Corp.
St. Louis Car Co.

Seats, Bus
Brill Co., The J. G.
Hale-Kilburn Co.
St. Louis Car Co.

Seats, Car (See also Rattan)
Brill Co., The J. G.
Cincinnati Car Co.
Hale-Kilburn Co.
St. Louis Car Co.

Second Hand Equipment
Electric Equipment Co.
Salzberg, Inc., H. E.

Shades, Vestibule
Brill Co., The J. G.
Cincinnati Car Co.

Shovels
Brill Co., The J. G.
Hubbard & Co.

Shovels, Power
Brill Co., The J. G.

Side Bearings (See Bearings Center and Side)

Signals, Car Starting
Consolidated Car Heating Co.
Elec. Service Supplies Co.
National Pneumatic Co.

Signals, Indicating
Nichols-Lintern Co.

Signal Systems, Block
Elec. Service Supplies Co.
Nachod and United States Electric Signal Co.
Wood Co., Chas. N.

Signal Systems, Highway Crossing
Nachod and United States Electric Signal Co.
Wood Co., Chas. N.

Slack Adjusters (See Brake Adjusters)

Sleet Wheels and Cutters
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
National Bearing Metals Corp.
R. D. Nuttall Co.

Smokestacks, Car
Nichols-Lintern Co.

Snow Plows
National Ry. Appliance Co

Snow-Plows, Sweepers and Brooms
Brill Co., The J. G.
Columbia Machine Works & M. I. Co.
Consolidated Car Fender Co
Cummings Car & Coach Co
St. Louis Car Co.

Snow Sweeper, Rattan
J. G. Brill Co.

Soldering and Brazing Apparatus (See Welding Processes and Apparatus)

Special Adhesive Papers
Irvington Varnish & Ins. Co.

Special Trackwork
Bethlehem Steel Co.
Lorain Steel Co.
Wm. Wharton, Jr. & Co.

Spikes
American Steel & Wire Co.

Splicing Compounds
Westinghouse E. & M. Co.

Splicing Sleeves (See Clamps and Connectors)

Springs
National Ry. Appliance Co.

Springs, Car and Truck
American Spiral Spring Co
American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
Standard Steel Works

Sprinklers, Track and Road
Brill Co., The J. G.
Cummings Car & Coach Co.
St. Louis Car Co.

Steel and Steel Products
American Steel & Wire Co.
Carnegie Steel Co.

Steps, Car
Brill Co., The J. G.
Cincinnati Car Co.

Stokers, Mechanical
Babcock & Wilcox Co.
Westinghouse E. & M. Co.

Stop Signals
Nichols-Lintern Co.

Storage Batteries (See Batteries, Storage)

Strain Insulators
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Strand
American Steel & Wire Co.
Roebling's Sons Co., J. A.

Street Cars (See Cars, Passenger, Freight, Express)
Cummings Car & Coach Co.

Superheaters
Babcock & Wilcox Co.

Sweepers, Snow (See Snow Plows, Sweepers and Brooms)

Switches
General Electric Co.

Switch Stands and Fixtures
Ramapo-Ajax Corp.

Switches, Selector
Nichols-Lintern Co.

Switches and Switchboards
Consolidated Car Heating Co.
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

Switches, Tee Rail
Ramapo-Ajax Corp.

Switches, Track (See Track Special Work

Tampers, Tie
Railway Trackwork Co.

Tapes and Cloths (See Insulating Cloth, Paper and Tape)

Tee Rail Special Track Work
Ramapo-Ajax Corp.

Telephones and Parts
Elec. Service Supplies Co.

Telephone & Telegraph Wire
American Steel & Wire Co
John A. Roeblings Sons Co.

Testing Instruments (See Instruments, Measuring, Testing, etc.)

Thermostats
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter

(Continued on page 42)

The DIFFERENTIAL CAR



Standard on 60 Railways for

Track Maintenance
Track Construction
Ash Disposal
Coal Hauling
Concrete Materials
Waste Handling
Excavated Materials
Hauling Cross Ties
Snow Disposal

Use These Labor Savers

Differential Crane Car
Clark Concrete Breaker
Differential 3-way Auto Truck Body
Differential Car Wheel Truck and Tractor

THE DIFFERENTIAL STEEL CAR CO., Findlay, O.

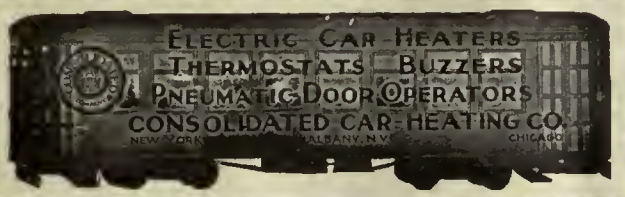


Type R-11
Double Register

International Registers

Made in single and double types to meet requirements of service. For hand or foot, mechanical or electric operation. Counters, car fittings, conductors' punches.

The International Register Co.
15 South Throop Street, Chicago, Illinois



"Bates Poles Outlive the Bond Issues that Buy Them"

BATES POLES AND STRUCTURES

BEST Bates Expanded Steel Truss Co.

General Offices and Plants
EAST CHICAGO, INDIANA, U. S. A.

NACHOD & UNITED STATES SIGNAL CO., INC.

LOUISVILLE, KY.

BLOCK SIGNALS
FOR
ELECTRIC RAILWAYS
HIGHWAY CROSSING SIGNALS



RAILWAY UTILITY COMPANY

CAR COMFORT WITH UTILITY

HEATERS
REGULATORS
VENTILATORS

2241-2247 Indiana St.
Chicago, Ill.

Write for Catalogue

1328 Broadway
New York, N. Y.

GOLD CAR HEATING & LIGHTING CO.

220 36th St., Brooklyn, N. Y.

ELECTRIC HEATERS WITH OPEN COIL OR ENCLOSED ELEMENTS
THERMOSTAT CONTROL—VENTILATORS

WRITE FOR NEW CATALOGUE





STUCKI SIDE BEARINGS

A. STUCKI CO.
Oliver Bldg.
Pittsburgh, Pa.

H B LIFE GUARDS

PROVIDENCE FENDERS

Manufactured by
CONSOLIDATED CAR FENDER CO., PROVIDENCE, R. I.
General Sales Agents
WENDELL & MacDUFFIE CO., 110 E. 42nd St., N. Y. C.

PRETTYMAN PRESERVED P27 FOREST PRODUCTS

CREOSOTED

Railroad Cross-ties; Switch-ties; Bridge Timbers; Construction Timbers; Mine Timbers, Lumber; Piling; Poles; Posts and other Forest Products

J. F. Prettyman & Sons
Wood Preserving Plant
Charleston, S. C.



CHILLINGWORTH

One-Piece Gear Cases

Seamless—Rivetless—Light Weight
Best for Service — Durability and Economy. *Write Us.*

Chillingworth Mfg. Co.
Jersey City, N. J.

Chapman Automatic Signals

Charles N. Wood Co., Boston



HASKELITE ROOFS

Haskelite Manufacturing Corporation,
133 West Washington Street, Chicago

PLYMETL SIDE PANELS

ALPHABETICAL INDEX TO ADVERTISEMENTS

Page

A

American Appraisal Co., The... 36
American Brass Co., The..... 39
American Car Co.....Third Cover
American Electrical Works.... 39
American Steel & Wire Co..... 39
Anaconda Copper Mining Co.... 39

B

Babcock & Wilcox Co..... 31
Bates Expanded Steel Truss Co. 41
Beeler Organization 30
Bell Lumber Co..... 39
Bemis Car Truck Co..... 31
Bethlehem Steel Co..... 36
Bibbins, J. Rowland 30
Brill Co., The J. G..36, Third Cover
Buchanan & Layng Corp..... 30

C

Carnegie Steel Co..... 32
Central Alloy Steel Corp..... 22
Chillingworth Mfg. Co..... 41
Cincinnati Car Co.....16-17
Cleveland Fare Box Co..... 36
Collier, Inc., Barron G..... 29
Columbia Machine Works, The. 35
Consolidated Car Fender Co.... 41
Consolidated Car Heating Co... 41

D

Day & Zimmermann, Inc..... 30
Dayton Mechanical Tie Co.,
Insert 33-34
Differential Steel Car Co., The.. 41

E

Electric Equipment Co..... 37
Electric Ry. Equipment Co..... 39
Electric Service Supplies Co.... 9

Page

F

Faile & Co., E. H..... 30
Ford, Bacon & Davis..... 30
"For Sale" Ads..... 37

G

General Electric Co..20, Back Cover
Gold Car Heating & Lighting Co. 41
Griffin Wheel Co..... 32

H

Hale-Kilburn Co. 31
Haskelite Mfg. Corp..... .. 41
"Help Wanted" Ads..... 37
Hemphill & Wells 30
Holst Englehardt W..... 30
Hubbard & Co..... 31

I

International Oxygen Co..... 31
International Register Co..... 41
International Steel Tie Co., The. 7
International Creosoting & Construction Co. 23
Irvington Varnish & Insulator Co. 36

J

Jackson, Walter 30
Johnson Fare Box Co..... 35

K

Kelker, DeLeuw & Co..... 30
Kuhlman Car Co.....Third Cover

L

Lorain Steel Co..... 36

Page

M

McClellan & Junkersfeld..... 30
McGovern, Halsey..... 31
Milwaukee Elec. Ry. & Lt. Co.. 37

N

Nachod and U. S. Signal Co.... 41
National Bearing Metals Corp.. 32
National Brake Co., Inc..... 21
National Pneumatic Co..... 15
National Ry. Appliance Co.... 36
Naugle Pole & Tie Co..... 39
Nichols Lintern Co..... 39
Nuttall Co., R. D..... 35

O

Oakite Products, Inc..... 32
Ohio Brass Co..... 5
Okonite-Callender Cable Company, Inc., The..... 39
Okonite Co., The..... 39

P

Perey Mfg. Co., Inc..... 39
Positions Wanted and Vacant.. 37
Prettyman & Sons, J. F..... 41

R

Railway Track-Work Co..... 31
Railway Utility Co..... 41
Ramapo Ajax Corp..... 41
Richey, Albert 30
Roebling's Sons Co., John A... 39

S

St. Louis Car Co.....18-19
Safety Car Devices Co..... 6

Page

Salzberg Co., Inc., H. E..... 37
Samson Cordage Works..... 39
Sanderson & Porter..... 30
Searchlight Section 37
Smith Heater Co., Peter..... 31
Standard Steel Works Co..... 10
Star Brass Works..... 36
Stevens & Wood, Inc..... 30
Stone & Webster 30
Stucki Co., A..... 41
Studebaker Corp. of America,
Insert 25, 26, 27, 28

T

Thomas Car Works, Perley A.. 8
Twin Coach Corp.....Front Cover

U

Una Welding & Bonding Co.... 31
Universal Lubricating Co..... 31

W

"Want" Ads 37
Wason Mfg. Co.....Third Cover
Westinghouse Elec. & Mfg. Co.,
Second Cover
Westinghouse Traction Brake Co. 4
Wharton, Jr. & Co., Inc., Wm.. 36
"What and Where to Buy."
38-40-42
White Eng. Corp., The J. G... 30
Wish Service, The P. Edw..... 31
Wood Co., Chas. N..... 41

Y

Yellow Truck & Coach Co.,
Insert 11-12-13-14

WHAT AND WHERE TO BUY—Continued from page 40

Ticket Choppers and Destroyers
Elec. Service Supplies Co

Ties and Tie Rods, Steel
Carnegie Steel Co.
International Steel Tie Co.

Ties, Mechanical
Dayton Mechanical Tie Co.

Ties, Wood Cross (See Poles, Ties, Posts, etc.)

Tokens
Johnson Fare Box Co.

Tongue Switches
Wm. Wharton, Jr. & Co.

Tools, Track & Miscellaneous
American Steel & Wire Co.
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
Hubbard & Co.
Railway Trackwork Co.
Ramapo-Ajax Corp.

Towers and Transmission Structure
American Bridge Co.
Bates Expanded Steel Truss Co.
Westinghouse E. & M. Co.

Track Grinder
Railway Trackwork Co.
Ramapo-Ajax Corp.

Track, Special Work
Columbia Machine Works & M. I. Co.
Ramapo Ajax Corp.

Trackless Trolley Cars
Brill Co., The J. G.
St. Louis Car Co.

Transformers
General Electric Co.
Westinghouse E. & M. Co.

Treads, Safety Stair, Car Step
Cincinnati Car Co.

Tree Wire
Okonite Co.
Okonite-Callender Cable Co

Trolley Bases
National Bearing Metals Corp.
R. D. Nuttall Co.
Ohio Brass Co.

Trolley Bases, Retrieving
R. D. Nuttall Co.
Ohio Brass Co.

Trolley Buses
Brill Co., The J. G.
Westinghouse E. & M. Co.

Trolley Material, Overhead
Elec. Service Supplies Co.
General Electric Co.
National Bearing Metals Corp.
Ohio Brass Co.
Westinghouse E. & M. Co.

Trolley Wheel Bushings
National Bearing Metals Corp.
Star Brass Works

Trolley Wheels (See Wheels Trolley)

Trolley Wire
Amer. Electrical Works
American Brass Co.
American Steel & Wire Co.
Anaconda Copper Min. Co.
Roebling's Sons Co., J. A.

Trucks, Car
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Cummings Car & Coach Co.
St. Louis Car Co.

Trucks, Motor
White Company

Truss Planks
Haskelite Mfg. Corp.

Tubing, Yellow and Black Flexible Varnish
Irvington Varnish & Ins.

Turbines, Steam
General Electric Co.
Westinghouse E. & M. Co.

Turntables
Elec. Service Supplies Co.

Turnstiles
Elec. Service Supplies Co.
Perey Mfg. Co., Inc.

Valves
Ohio Brass Co.
Westinghouse Tr. Br. Co

Varnished Papers and Silks
Irvington Varnish & Ins. Co.

Ventilators, Car
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Heating Co.
Nichols-Lintern Co.
Nat'l. Ry. Appliance Co.
Railway Utility Co.
St. Louis Car Co.

Vestibule Linings
Haskelite Mfg. Corp.

Welded Rail Joints
Railway Trackwork Co.
Una Welding & Bonding Co.

Welders, Portable Electric
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Welders, Rail Joint
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.

Welding & Cutting Tools
International Oxygen Co.

Welding Processes and Apparatus
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Welding, Steel
Railway Trackwork Co.
Una Welding & Bonding Co.

Welding Wire
American Steel & Wire Co.
Railway Trackwork Co.
Roebling's Sons Co., J. A.

Welding Wire and Rods
Railway Trackwork Co.

Wheel Guards (See Fenders and Wheel Guards)

Wheel Presses (See Machine Tools)

Wheels, Car, Cast Iron
Griffin Wheel Co.

Wheels, Car, Steel & Steel Tire
Bemis Car Truck Co.
Carnegie Steel Co.
Standard Steel Works

Wheels, Trolley
Columbia Machine Works & M. I. Co.
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
National Bearing Metals Corp.
R. D. Nuttall Co.
Star Brass Works

Wheels, Wrought Steel
Carnegie Steel Co.

Whistles, Air
Ohio Brass Co.
Westinghouse E. & M. Co
Westinghouse Traction Brake Co.

Window Guards & Fittings
Cincinnati Car Co.

Wire Rope
American Steel & Wire Co
Roebling's Sons Co., J. A.

Wires and Cables
American Brass Co.
American Electrical Works
American Steel & Wire Co
Anaconda Copper Min. Co
General Electric Co.
Okonite Co.
Okonite-Callender Cable Co Inc.
Roebling's Sons Co., J. A
Westinghouse E. & M. Co



No. 201-B-1 Type

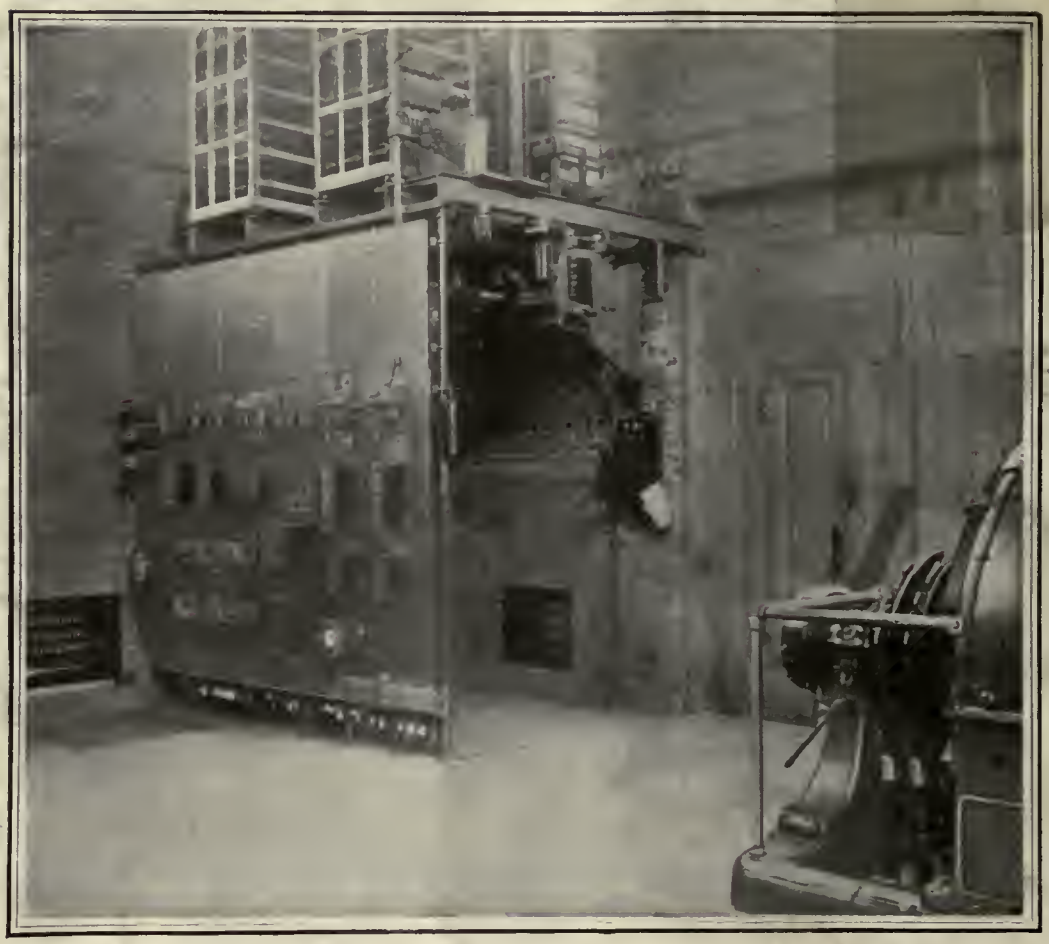
A Seat Worthy of the 1928 Model Car

Throughout the development of its design and influencing the selection of every piece of equipment on the Brill 1928 Model Electric Car was one particular thought—a type of car which would measure up in every way to the demand for a more attractive public conveyance.

Consequently, the Brill No. 201-B-1 was selected to contribute its part in obtaining desired results.

Deep spring leather upholstered cushions, a semi-individual type back pitched back to a most comfortable degree, and a simple yet positive reversing mechanism which suggests minimum maintenance in long and satisfactory service. The Brill No. 201-B-1 Seat is certainly worthy of this latest development in electric cars —the Brill 1928 Model.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.
AMERICAN CAR CO. ST. LOUIS MO. — G.C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.



Lake Bluff Automatic Substation of the Chicago, North Shore & Milwaukee. In operation since February, 1919.

—built to endure

The unvarying good performance of the original automatic substations of the Chicago, North Shore & Milwaukee Railroad indicates that G-E Automatic Equipment is built to endure. The first was placed in operation in 1917 and its probable length of life is still for the future to determine.

The "North Shore's" growing list of automatic substations and its present program of installing automatic equipment in manual stations attest this company's confidence in G-E Automatics.

The G-E Automatic Equipments being built today are still further improved over those that are in regular operation after ten years of continuous service.

Three years before the Chicago, North Shore & Milwaukee adopted automatic control, the first automatic substation (G-E) was put into operation. This station is one of the several G-E Automatics that have been in service 10 years or more.

3-21

GENERAL ELECTRIC

BOUND BY
HM